INDIA RUBBER WORLD

NATURAL & SYNTHETIC

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JUNE, 1945

STERLING
FURNACE BLACKS
GODFREY L. CABOT, INC. BOSTON, MASS

Newsletter No. 6
JUNE, 1945

Published by Rubber Chemicals Division of DUPONT

THIONEX

OUTSTANDING ACCELERATOR FOR GR-S

THIONEX — tetra-methyl-thiuram-monosulfide — widely used in rubber processing, has become one of the most important and versatile accelerators for the many different types of GR-S compounds. Its low price makes it economical either as a primary or as a secondary accelerator. Further economy and other advantages for certain GR-S products may be gained by activating it with other accelerators, such as 2-MT, Barak and Accelerator 808, to produce fast curing, economical, high quality stocks, or by its use as a secondary accelerator to activate Zenite, 2-MT, MBTS, Acrin and others.

ACCELERATION OF GR-S with Thionex has these advantages:

1. **Safety in processing.**
2. **Rapid curing at vulcanizing temperatures.**
3. **Broad, flat curing range.**
4. **High tensile strength.**
5. **Excellent aging and superior heat resistance.**
6. **Versatility of activation.**
7. **Acceleration economy.**

DELAYED ACTION OR LAG of Thionex acceleration makes for safety in processing, with very fast rate of cure at vulcanizing temperatures. GR-S compounds accelerated with Thionex may be exposed to temperatures nearly as high as the curing temperature for a short period of time without setting up. After this period of lag the cure proceeds rapidly to completion — a characteristic which has brought Thionex widespread use in a variety of products such as CV wire insulation, drug sundries, mechanical goods, heels and soles, and inner tubes.

THIONEX accelerated GR-S compounds have a long curing range with very little tendency toward over cure. There is practically no change in tensile strength, modulus elongation at break, tear strength or hardness when the time of cure is extended from 30 to 120 minutes.

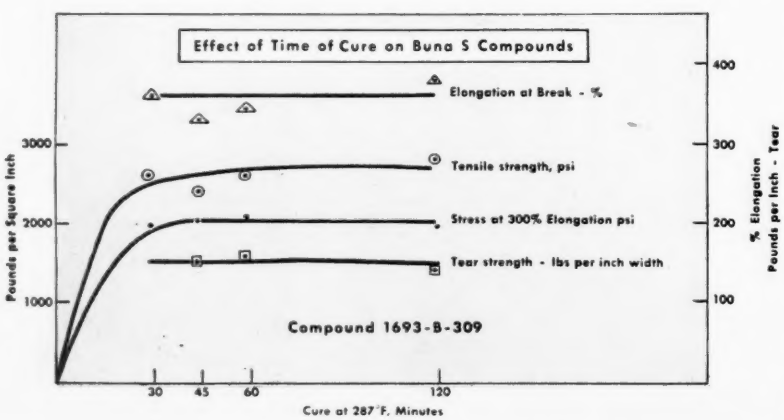

TABLE I

	Original	Aged in 100° C. Oven	
		2 Days	4 Days
Stress at 200% Elongation—psi	650	850	850
Tensile Strength at Break—psi	2525	2650	2325
Elongation at Break—%	440	410	390
Hardness—Shore Durometer	65	68	69

The effects on these properties of varying the time of cure is shown graphically in the accompanying chart.

PROPER AMOUNT of Thionex to be used depends on the nature of the compound, type of cure, choice and type of fillers, and sulfur content. From 0.25% to 4.0% may be used, depending on the characteristics desired in the finished article. Either over or under acceleration will impair the tensile properties of a GR-S compound and for this reason, the proper ratio of Thionex to sulfur should be maintained for best results.

Normally in the neighborhood of 2.0% sulfur is recommended in GR-S compounds accelerated with Thionex, but amounts up to 3.0% or 4.0% may be used to obtain improved dynamic properties. Low sulfur-high Thionex ratios are recommended for applications where a high degree of heat resistance is required. Results of physical tests shown in Table I on a typical black loaded GR-S compound accelerated with 1.5% Thionex and 0.75% sulfur illustrate the excellent heat resistance that is obtainable with this combination.

More detailed information concerning the compounding of GR-S, including specific acceleration suggestions, is presented in various BL reports. It is available to rubber technologists upon request.

BACK THE ATTACK WITH WAR BONDS

DUPONT
REG. U.S. PAT. OFF.

RUBBER CHEMICALS DIVISION

BETTER THINGS FOR BETTER LIVING . . . *Through Chemistry*

INDIA RUBBER WORLD, June, 1945, Vol. 112, No. 3. Published monthly by BILL BROTHERS PUBLISHING CORP., 386 Fourth Avenue, New York 16, N. Y., U. S. A. Entered as second-class matter December 27, 1944, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Subscription, United States and Mexico, $3.00 per year; all other countries, $4.00; single copies, 35 cents.

NOLOGY DEPT.

Do you stick

RUBBER TO RUBBER

RUBBER TO FABRIC

RUBBER TO LEATHER

CANVAS TO METAL

FABRIC TO LEATHER

FABRIC TO FABRIC

PLASTIC TO PLASTIC

?

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WE HAVE THE ANSWER TO YOUR BONDING PROBLEM

We have it or we'll find it. Our case histories cover not only many pre-war bonding problems, but just about every cementing operation in the manufacture of war equipment — life rafts and life belts, raincoats, storm suits, gas masks, pontons, combat boots, delousing bags, jungle hammocks, barrage balloons and many other items.

Many of these new formulations, developed under war pressure, are applicable to civilian use.

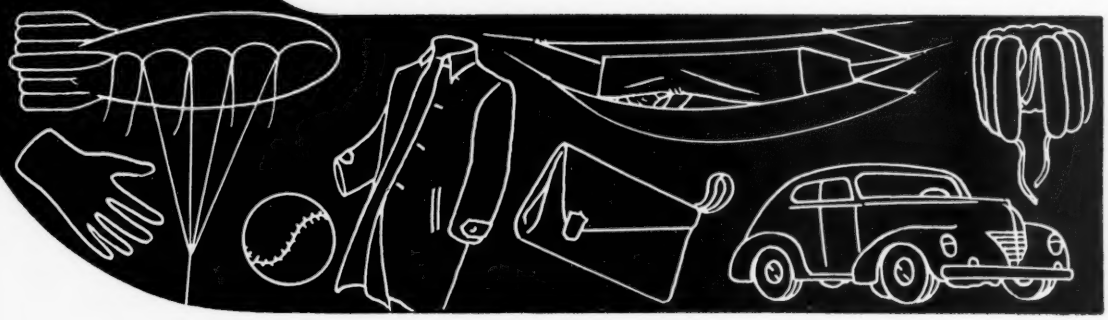
Long experience with synthetic rubbers and resins, plus our constant study and daily development of new formulations and techniques, are solving specific problems for our customers.

This experience offers you a valuable laboratory resource for developing just the right cements for your special needs.

Our manufacturing facilities provide a quality controlled source of supply.

ANGIER PRODUCTS INC.
120 POTTER STREET
CAMBRIDGE 42, MASS.

Write us about your present or post-war requirements, stating in detail any specific problem involved.



PHILBLACK A aids processing

...And How!

As in this shotgun wedding, Philblack A takes the nerve out of synthetic rubber —fast—with a minimum mixing cycle. Yes, it's really marvelous what Philblack A can accomplish in the way of easy processing, smooth extrusion, better calendering, and excellent mold flow.

This new and better black is now being used in large quantities for the manufacture of high quality tires, inner tubes, and mechanical goods. And Philblack A makes possible the maintenance of quality with the lesser loadings required because of carbon black use curtailment.

PHILLIPS PETROLEUM COMPANY

Philblack Division

FIRST CENTRAL TOWER · AKRON, OHIO

NAUGATUCK ACCELERATION FOR GR-S

BJF

COMBINES THE PROPERTIES OF THIAZOLE AND ALDEHYDEAMINE IN GR-S COMPOUNDS

FLAT CURING RANGE • LOW PERSISTENCY
ACTIVATED BY GUANIDINES AND THIURAMS
SAFE PROCESSING • ECONOMICAL

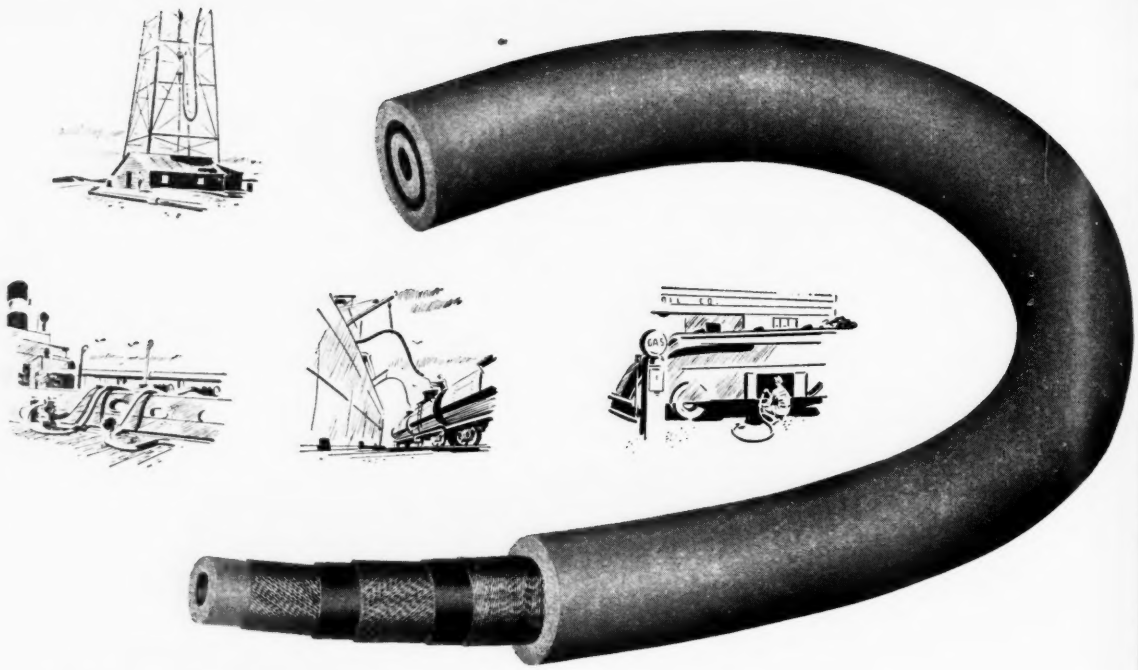
Recommended for

TIRE TREADS AND CARCASSES
CAMELBACK AND TIRE REPAIR STOCKS
CONVEYOR AND POWER BELTING
MOLDED PRODUCTS — SOLES AND HEELS

Write for Bulletin on BJF in GR-S Compounds

Process—Accelerate—Protect
WITH NAUGATUCK CHEMICALS

Naugatuck Chemical
DIVISION OF UNITED STATES RUBBER COMPANY
ROCKEFELLER CENTER NEW YORK 20, N. Y.
IN CANADA: *Naugatuck Chemicals Division, Dominion Rubber Co., Elmira, Ont.*



BACKBONE... For a High Pressure Hose

OIL well rotary drilling hose has to take pressures up to 5,000 pounds, stand up under constant flexing and re-flexing, carry heavy volumes of fast-flowing mud to lubricate the drilling. It takes plenty of *backbone* to hold up under that kind of strain, and so in this hose, as in many other types, the backbone is steel wire.

Only the highest quality steel *wire* can provide the necessary reinforcement for strength and long life . . . its use in fabricated form helps provide the highest degree of flexibility necessary for this rugged service.

That's why most leading hose manufacturers have consistently specified braided *steel wire* especially developed with essential characteristics for hose reinforcement.

Developing and producing that kind of wire has been National-Standard's main job since the early days of the rubber industry. Close cooperation between rubber engineers and National-Standard wire experts has resulted in uniform high quality wire for many types of hose, brought forth time-saving, cost-reducing machinery for the application of wire into finished products, and has lead to many *new* uses for wire with rubber. Tires, airplane de-icers, conveyor belts, V-belts, and tubing are only the beginning of even greater wire-and-rubber developments to come.

If you have plans for product improvement or development, let National-Standard's experience help with a type of wire and method of application specifically fitted to your product.

BUY AND KEEP WAR BONDS

NS
NATIONAL-STANDARD Company
NILES, MICHIGAN

Divisions of National-Standard Company

NATIONAL-STANDARD
Niles, Mich.
TIRE WIRE, FABRICATED BRAIDS AND TAPE

ATHENIA STEEL
Clifton, N. J.
COLD ROLLED, HIGH-CARBON SPRING STEEL

WAGNER LITHO MACHINERY
Hoboken, N. J.
LITHOGRAPHING AND SPECIAL MACHINERY

WORCESTER WIRE WORKS
Worcester, Mass.
ROUND STEEL WIRE, SMALL SIZES

HYCAR PRICES REDUCED AGAIN!

FOR the 5th time in less than 4 years we are reducing the price of Hycar. These new low prices and Hycar's proven high quality, uniformity, and versatility make it the logical material around which to build your postwar business. By so doing you can be assured of using a synthetic rubber with a demonstrated competitive future.

PRICE SCHEDULE— Effective on Shipments Beginning June 1, 1945

DRY RUBBER		
	Price per lb. Std. 100-lb. Containers	*Specific Gravity*
HYCAR OR-15	$0.45	1.00
HYCAR OR-25	0.40	0.98
HYCAR OS-10	0.40	0.98

LATEX			
	Per lb. solids in Buyer's Tank Cars	*Per lb. solids Drums—Carload (Min. 50 Drums)*	*Per lb. solids Drums LCL*
HYCAR OR-15	$0.43	$0.45	$0.47
HYCAR OR-25	0.38	0.40	0.42
HYCAR OS-10	0.38	0.40	0.42

Prices are net and F. O. B. Akron, Ohio

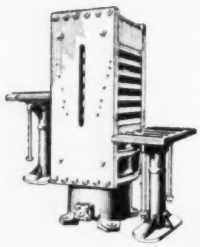
Hycar's Technical Staff is at your service, ready to help you with your individual problems. *Hycar Chemical Company, Akron 8, Ohio.*

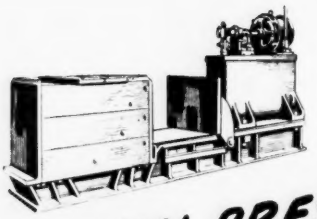
Hycar

Reg. U. S. Pat. Off.

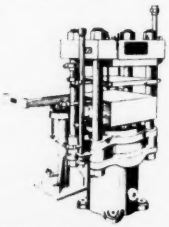
LARGEST PRIVATE PRODUCER OF BUTADIENE TYPE

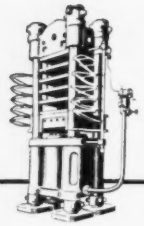
Synthetic Rubbers

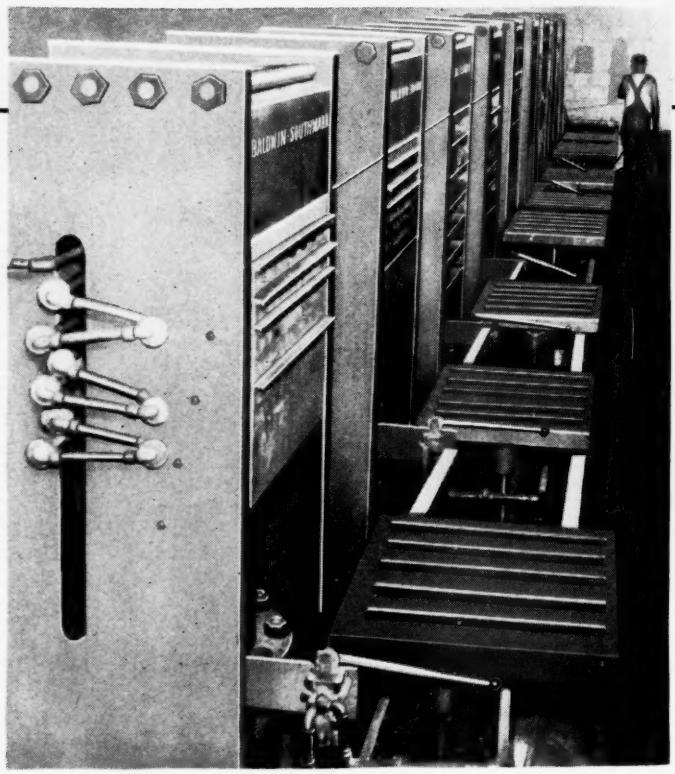




THESE BALDWIN PRESSES HELP YOU KEEP UP WITH ORDERS ... and with competition!







Baldwin has been working with the rubber field for many years, and every Baldwin Press produced reflects this long and intimate association. You'll find developments for improving quality and output on every Baldwin Press, plus sound engineering, expert machine work, and built-in life and dependability.

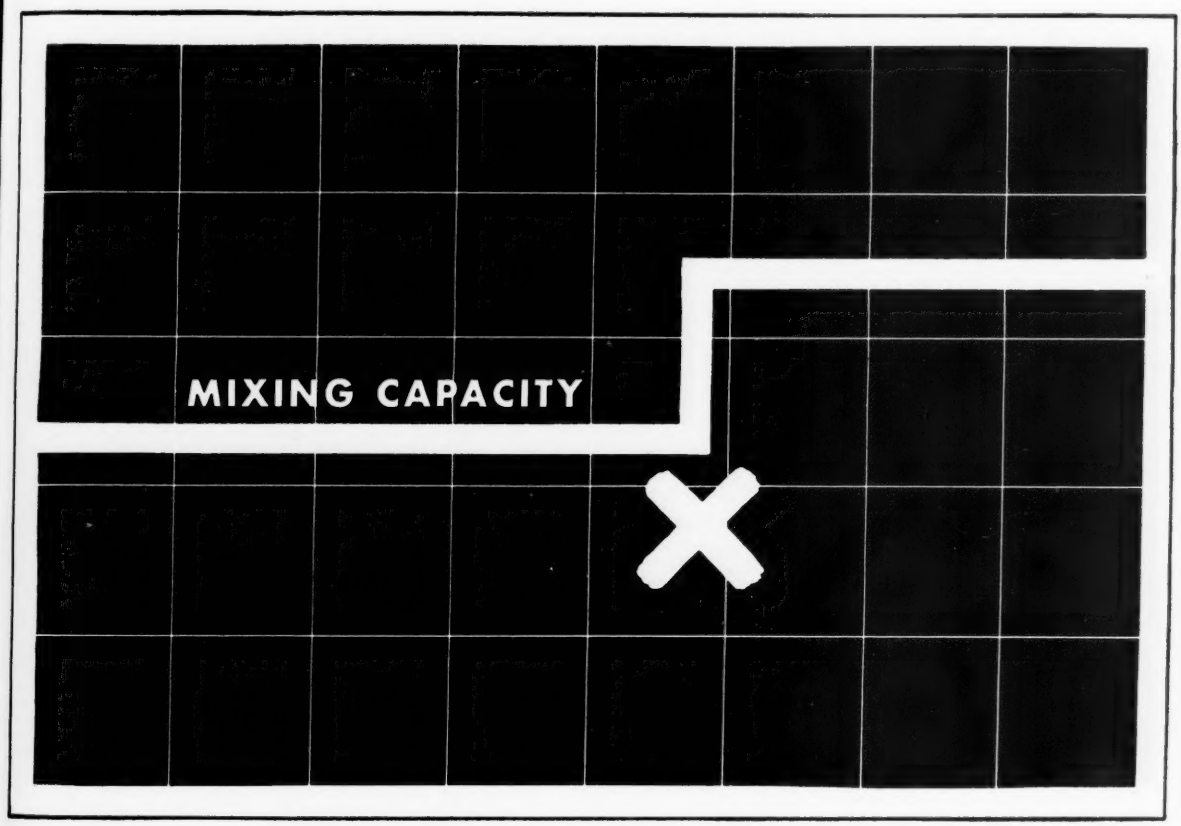
The Baldwin line includes types and models to meet all ordinary needs. If you need a special press to produce a new product, or to meet some unusual situation, Baldwin experience is waiting to design and build it for you. Ask for Bulletin 160. The Baldwin Locomotive Works, Baldwin Southwark Division, Phila., Pa., U. S. A. Offices: Philadelphia, New York, Washington, Boston, Chicago, Cleveland, St. Louis, Detroit, San Francisco, Houston, Pittsburgh.

BLW THE BALDWIN GROUP **BALDWIN**

HYDRAULIC PRESSES

X MARKS THE SPOT . . .

WHERE NAFTEX WAS ADDED



NAFTEX is a combination of SRF or HMF black and sulfur-reactive plasticizer. Through the use of NAFTEX it may be possible to increase substantially your mixing capacity without increasing your labor or equipment requirements. Our technical representatives will be glad to discuss your particular mixing and compounding problem.

NAFTEX is relatively dustless and is in the form of dry, free-flowing pellets, with the plasticizer uniformly and completely absorbed. Thus, in addition to increased mixing capacity, NAFTEX offers the added advantages of reducing carbon black dust and eliminating the handling of viscous liquid plasticizers. Technical data and laboratory samples are available.

W
C=C

REG. U. S. PAT. OFFICE

WILMINGTON

CHEMICAL CORPORATION

10 EAST 40TH STREET • NEW YORK 16, N. Y.

Technical Bulletin No. 11

on the Compounding of GR-S with Substantial Loadings of Zinc Oxide

100 Parts of Zinc Oxide with GR-S-10 (Rosin Soap Polymer)

Benzothiazyldisulfide Acceleration

(Refer to Technical Bulletins No. 9 and No. 10)

CONTINUING the study of Zinc Oxide performance in the rosin soap polymer, benzothiazyldisulfide has been found to give quite satisfactory stress-strain properties and improved tear resistance, both at room temperature and 100°C. Possibly, a compound with lower permanent set at break and better rebound and heat generating properties could be obtained by increasing the sulfur content to 3.5, without seriously impairing the cut-growth resistance. Reduced coumarone-indene resin and ELC magnesia still appear to be desirable additions to the compound.

COMPOUND No. 11

GR-S-10	100.0
Sulfur	3.0
Benzothiazyl-disulfide	2.0
ELC Magnesia	5.0
Coumarone-indene resin	3.0
Zinc Oxide	100.0

ORIGINAL RESULTS

Time of Cure Min. at 45 Lb.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of				Permanent Set
			200%	300%	400%	500%	
7.5	250	1040	35	70	110	145	.51
15	1950	760	225	335	410	635	.19
30	1630	650	235	310	465	740	.16
45	1735	610	265	415	680	980	.19
60	1285	580	265	415	605	940	.11
90	1755	630	260	375	560	860	.14

Time of Cure Min. at 45 Lb.	Shore Hardness	Goodyear-Healey Pendulum		Compression Fatigue (Goodrich Flexometer)*					Cut-Growth Resistance Inches Failure at	
		Indentation in mm.	Per Cent Rebound	Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise °C.	Dynamic Compression			
							Initial	Final	15,000 Cyc.	48,000 Cyc.
90	45	8.15	54.8	23.1	15'-2.7	17.5	14.3	15.4	.19	85

*Test Conditions: 100 Lb. Load. 0.15" Stroke. 100°C. Oven Temp.

Uniform Quality **HORSE HEAD ZINC OXIDES**

THE NEW JERSEY ZINC COMPANY

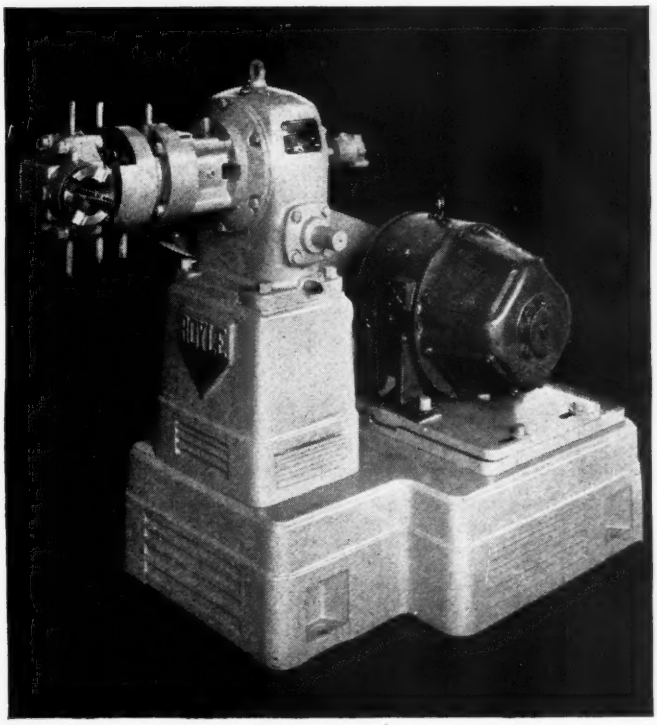
160 FRONT STREET • NEW YORK 7, N. Y.

Products Distributed by **THE NEW JERSEY ZINC SALES COMPANY**

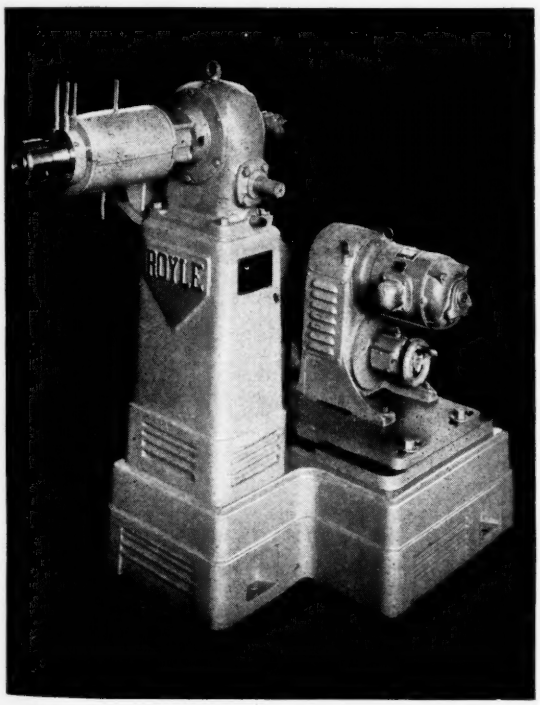
NEW YORK • CHICAGO • CLEVELAND • SAN FRANCISCO

New Jersey Zinc

Designed for Experimental and Product Extruding



Royle #1



Royle #½

- Rugged is the word to describe these compact and highly efficient Royle Continuous Extruding Machines — the No. ½ and No. 1. Their diminutive size embraces all of the characteristics required for larger and heavier extruding processes.

- Primarily designed to become an integral part of laboratory equipment — the technician can be sure that his experiment will have true relation to actual product extruding — these machines are efficient and economical producers of such products as tubes, rods, fine wire insulation, mono-filament and thread coating.

- Except for dimensional differences these machines possess identical characteristics.

JOHN ROYLE & SONS

ROYLE PATERSON N. J.

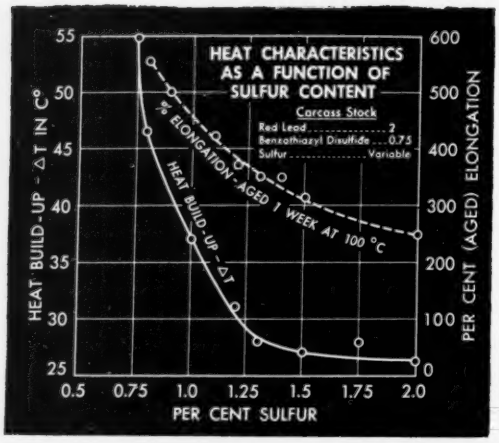
PIONEER BUILDERS OF EXTRUSION MACHINES SINCE 1880

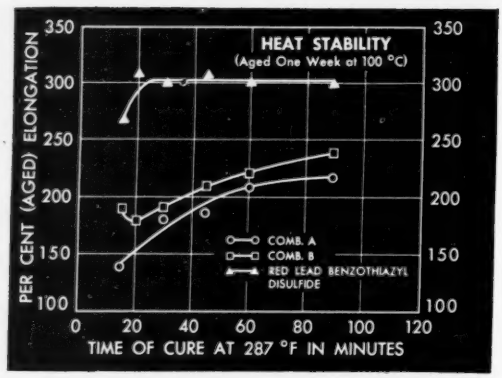
James Day (Machinery) Ltd
London, England
REgent 2430

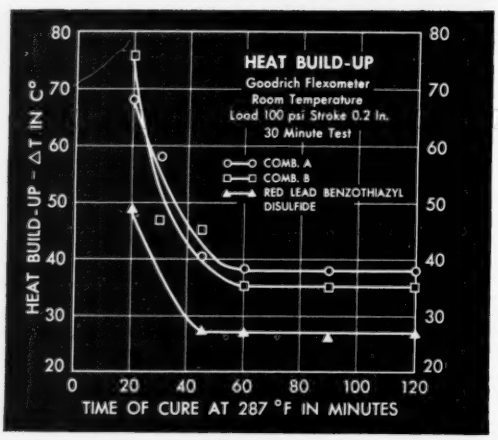
Home Office
B. H. Davis J. W. VanRiper
SHerwood 2-8262

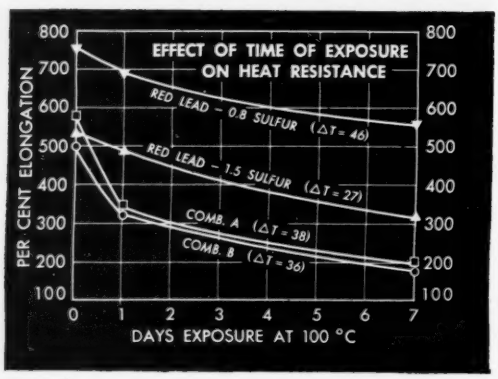
Akron, Ohio
J. C. Clinefelter
UNiversity 3726

PATERSON 3, NEW JERSEY


HEAT CHARACTERISTICS AS A FUNCTION OF SULFUR CONTENT
Carcass Stock
Red Lead 2
Benzothiazyl Disulfide 0.75
Sulfur ..... Variable
% ELONGATION AGED 1 WEEK AT 100 °C
HEAT BUILD-UP - ΔT
HEAT BUILD-UP - ΔT IN C°
PER CENT (AGED) ELONGATION
PER CENT SULFUR


HEAT STABILITY
(Aged One Week at 100 °C)
COMB. A
COMB. B
RED LEAD BENZOTHIAZYL DISULFIDE
PER CENT (AGED) ELONGATION
TIME OF CURE AT 287 °F IN MINUTES




EFFECT OF TIME OF EXPOSURE ON HEAT RESISTANCE
RED LEAD - 0.8 SULFUR (ΔT = 46)
RED LEAD - 1.5 SULFUR (ΔT = 27)
COMB. A (ΔT = 38)
COMB. B (ΔT = 36)
PER CENT ELONGATION
DAYS EXPOSURE AT 100 °C

Heat build-up and heat stability... both improve when you compound GR-S with RED LEAD

Have you had difficulty making your GR-S carcass stocks both heat resistant and cool running?

If so, try the right combination of red lead, benzothiazyl disulfide and sulfur.

Its acceleration is sufficiently active and efficient to provide—concurrently—heat stability and low heat build-up.

Note the following table and the accompanying charts.

FORMULA

GR-S (Institute)	100
S.R.F. Black	30
Zinc Oxide	3.0
Paraflux	2.5
No. 2 R.M. Red Lead	2.0
Benzothiazyl Disulfide	0.75
Sulfur	1.5

Physical Properties

T/287° F.	Tensile Strength	% Elong.	T-300	Shore	ΔT* in C°
15	1520	860	315	....	....
20	1630	780	390	46	49
30	1450	630	520	47	47
45	1330	530	570	47	27.5
60	1210	480	520	47	27
90	1130	500	590	47	26
120	1100	500	610	47	28

	Aged One Week at 100° C.			Aged 48 Hours at 100° C.	
T/287° F.	Tensile Strength	% Elong.	T-300	Shore	ΔT* in C°
15	910	270	.....	....	....
20	1080	320	1000	54	30.5
30	990	300	990	54	30.5
45	1050	310	1000	53	29.5
60	1130	300	1090	53	26
90	1090	300	1090	53	25
120	1160	340	1100	53	25

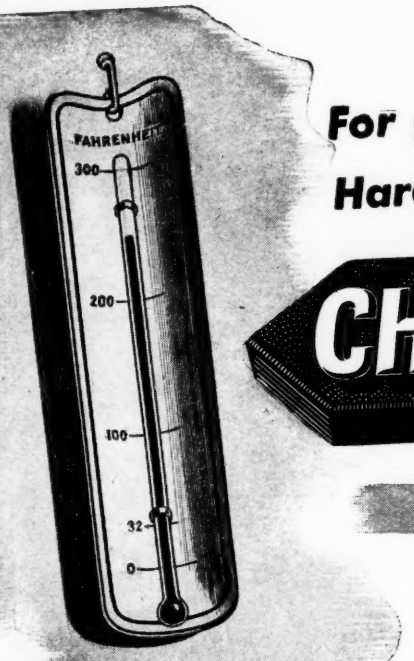
*Goodrich Flexometer operated at room temperature, 30 minute tests. Load 100 psi, stroke 20%.

SUMMARY OF ADVANTAGES

1. Imparts improved heat resistance—retention of elasticity.
2. Imparts improved heat build-up—cooler running.
3. Relatively faster curing rate.
4. Safe processing.
5. Excellent general physical properties.
6. Broad curing plateau—very little change in properties on overcures.
7. Economical.
8. Available.

The charts illustrated are taken from a report on recent experimental work by the Rubber Division of our Research Laboratories on the problem of heat build-up and heat stability in GR-S stocks. Write for your copy. The report is titled, "The Heat Problem in GR-S Carcass Stocks."

NATIONAL LEAD COMPANY New York, Buffalo, Chicago, Cincinnati, Cleveland, St. Louis, San Francisco; Boston (National-Boston Lead Co.); Pittsburgh (National Lead & Oil Co. of Penna.); Philadelphia (John T. Lewis & Bros. Co.)



For greater heat resistance in Hard Rubber Products, Specify

CHEMIGUM N-I

ABILITY to withstand temperatures ranging upwards of 250° F. is just one of the many advantages of finished hard rubber products made with CHEMIGUM N-1 —Goodyear's time-proved, oil-resistant synthetic rubber. Other advantages include:

EASIER MILLING—CHEMIGUM N-1 is heat-softening at processing temperatures, even when highly loaded. It breaks down in a few minutes, reduces batch time, cuts production costs.

BETTER PROCESSING CHARACTERISTICS—handles easier; makes smoother extruded tubes and rods—smoother finish when calendered, with minimum surface shrinkage.

RESISTANT TO ACIDS, OILS AND ALKALIS.

HIGHLY ADAPTABLE—lends itself readily to modification with plasticizers, fillers and extenders.

GREAT DURABILITY—finished products have high-tensile and impact strength, in addition to superior heat resistance.

SUPERIOR FOR SPONGE—CHEMIGUM N-1 can be supplied in a low-plasticity form especially suitable for chemically blown sponge applications. Its homogeneous nature permits blowing to uniform texture without excessive milling or refining.

AMPLE SUPPLY

Goodyear's large production of CHEMIGUM N-1 now assures manufacturers of adequate supplies, in consistent plasticities and uniform quality. For complete information and samples, write: Goodyear, Chemical Products Division, Plastics and Coatings Department, Akron 16, Ohio.

• *For products requiring extreme cold resistance, ask for information on* CHEMIGUM N-2.

GOODYEAR

THE GREATEST NAME IN RUBBER

CHEMIGUM pronounced Kem-e-gum—T.M. The Goodyear Tire & Rubber Company

A PRODUCT OF GOODYEAR RESEARCH

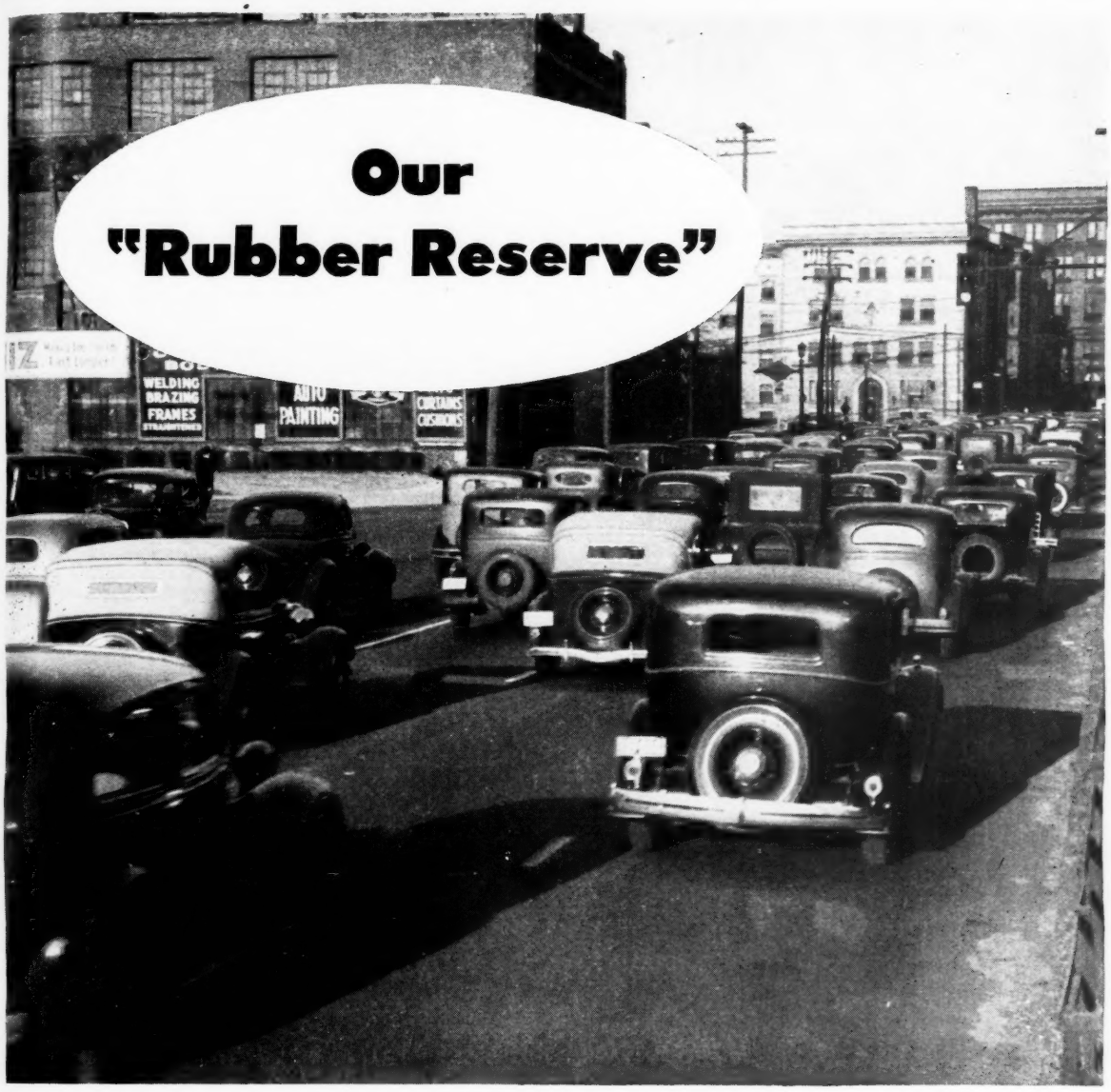
A Statement of Fact

The preference for ST. JOE Lead-Free ZINC OXIDE among the country's leading manufacturers in the rubber, paint and allied industries, is largely due to these reasons: The product's high chemical purity cleanliness and exceptional uniformity—all of which are made possible by our patented Electro-Thermic Process. Another factor is that in normal times, the facilities of our modern laboratories are available for any cooperative research program involving the use of zinc oxide. For, due to the flexibility of our Electro-Thermic Process, it is frequently possible to produce pigments having those *special* characteristics which the pre-determined end-use of the zinc oxide indicates as being most desirable.

ST. JOSEPH LEAD COMPANY

250 PARK AVE., NEW YORK, N. Y.

MADE BY THE LARGEST PRODUCER OF LEAD IN THE UNITED STATES



Our "Rubber Reserve"

Rubber men recently have been asking 2 questions. First, how long will the current supply of natural scrap rubber last? Second, what will we do when it is used up?

Philadelphia Rubber is able to come up with *three* answers to those two questions.

1. Our present stocks of natural rubber scrap for reclaim purposes will last at least through 1945—probably longer.

2. In addition, as near as we can estimate there are today 142,206,644 tires in service—either on the road or as spares—plus tremendous quantities of military tires. The large majority of these tires were made of natural rubber. As they are removed from service they will be added to the nation's supply of natural rubber scrap.

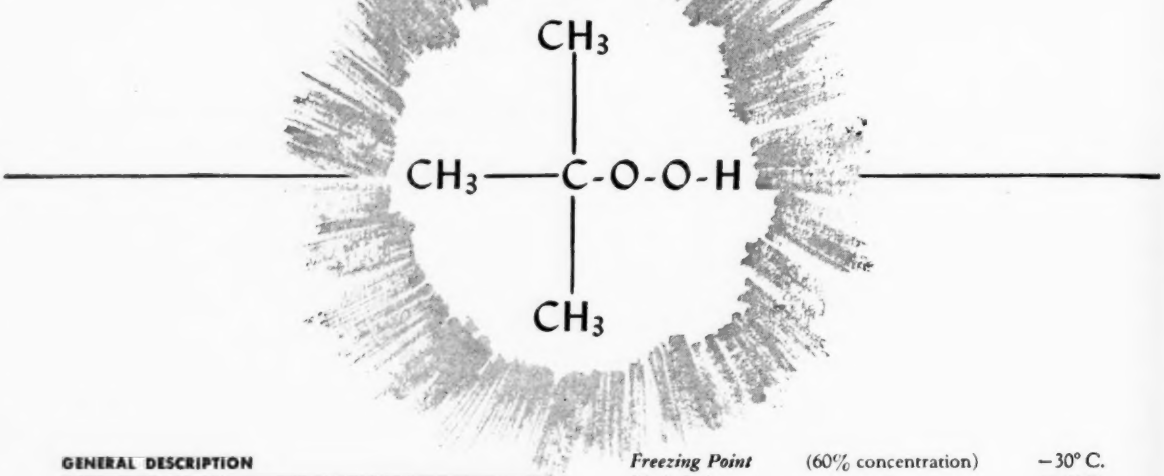
3. Philadelphia Rubber has already gained a thorough knowledge of how to reclaim synthetic rubber scrap. Our laboratory staff can work with you on solving any problems in connection with the use of synthetic reclaimed rubber.

All this should prove reassuring to users of reclaimed rubber. It should encourage you, as a user of reclaim, to continue to include it in your plans for the present and the future. *The Philadelphia Rubber Works Company, Rose Building, Cleveland 15, Ohio.*

PHILADELPHIA
RECLAIMED RUBBER

Commercial

t-BUTYL HYDROPEROXIDE*



GENERAL DESCRIPTION

t-Butyl Hydroperoxide is a new, organic, alkyl peroxide which offers extremely interesting possibilities. It is standardized at a concentration of 60% (10.66% available oxygen). Use of the proper activators increases the rate of release of the oxygen.

SUGGESTED USES

1. As a catalytic agent in one or two phase polymerizations. **(*t*-Butyl Hydroperoxide has proved to be an excellent catalyst for polymerizing Styrene, as well as certain Elastomers such as Buna S.)**
2. As a drying accelerator in oils, paints, varnishes, etc.
3. As a combustion accelerator for heavy fuel oils used in Diesel engines.
4. As an accelerator in the curing of synthetic resins.
5. As an accelerator in the vulcanization of certain synthetic rubbers.
6. As an oxidation agent for laboratory purposes.

PROPERTIES

Molecular Weight		90
Specific Gravity @ 25° C.	(60% concentration)	0.859
Boiling Point	"	82–83° C.
Freezing Point	(60% concentration)	−30° C.
Flash Point	"	18.3° C.
Refractive Index @ 25° C.	"	1.3960
Available Oxygen	"	10.66%
Color	"	Water White
pH of 1 part 60% Conc. in 10 parts water		4
Stability		Completely stable up to 76.6° C.
Solubility:	60% concentration in water	11%
	Water in 60% concentration	5%
	In short chain aliphatics	Excellent
	In aromatics	Excellent

ACTIVATORS

Hydroquinone and other similar organic reducing agents have proved to be efficient secondary catalysts in polymerization reactions (when used in quantities up to 0.1% of *t*-Butyl Hydroperoxide), greatly increasing the efficiency of polymerization. When use requires quick release of oxygen, the same proportions of Hydroquinone mentioned above have proved efficient.

• • •

For experimental samples of this interesting new peroxide, write the Union Bay State Chemical Company, Peroxide Division, 50 Harvard St., Cambridge 42, Massachusetts.

*U.S. PATS. 2176407 & 2223807

UBS

UNION BAY STATE
Chemical Company

Serving Industry with Creative Chemistry

ORGANIC CHEMICALS · SYNTHETIC LATEX · SYNTHETIC RUBBER
PLASTICS · INDUSTRIAL ADHESIVES · DISPERSIONS
COATING COMPOUNDS · IMPREGNATING MATERIALS · COMBINING CEMENTS

90-MILE LABORATORY

for Telephone and Television

BETWEEN telephone offices in New York and Philadelphia once stretched a strange sort of laboratory. Most of the way it was underground; engineers made their measurements sometimes in manholes. It was a lead-sheathed cable containing two "coaxials" — each of them a wire supported in the center of a flexible copper tube the size of a lead pencil.

Theory had convinced engineers of Bell Laboratories that a coaxial could carry many more telephone talks than a full-sized voice frequency telephone cable; that it could carry adequately a television program. Experimental lengths were tested; terminal apparatus was designed and tried out. Finally, a full-sized trial was made with a system designed for 480 conversations. It was successful; in one demonstration people talked over a 3800-mile circuit looped back and forth. Now the cable is carrying some of the wartime flood of telephone calls between these two big cities.

This cable made television history also: through it in 1940 were brought spot news pictures of a political convention in Philadelphia to be broadcast from New York. Bell System contributions to television, which began with transmission from Washington to New York in 1927, have been laid aside for war work. When peace returns, a notable expansion of coaxial circuits is planned for both telephone and television in our Bell System work.

BELL TELEPHONE LABORATORIES

Exploring and inventing, devising and perfecting for our Armed Forces at war and for continued improvements and economies in telephone service.

1. *Operator places tire on Spreading Machine. Knee-high platform and spreader head clearances make this easy.*

2. *Hydraulic control actuates arms which spread tire while operator inserts tube and flap.*

3. *Spreader arms close and lift up out of the way. Tire is removed, and next one rolled onto platform.*

How to Gain GREATER PROFITS from your Tire Tubing Operations

TUBING tires before shipping is standard practice among many tire manufacturers. It's the most efficient time to do it, and there's a big saving in shipping costs, packaging, and handling.

But here's how you may be able to *add* to those extra profits. The National Heavy Duty Tire Spreading Machine is specifically designed to give you *top efficiency* at *lowest cost* in your tire tubing operations. One man operates the machine, and because the circular platform is set close to the floor, heavy tires are easily handled with a minimum of effort.

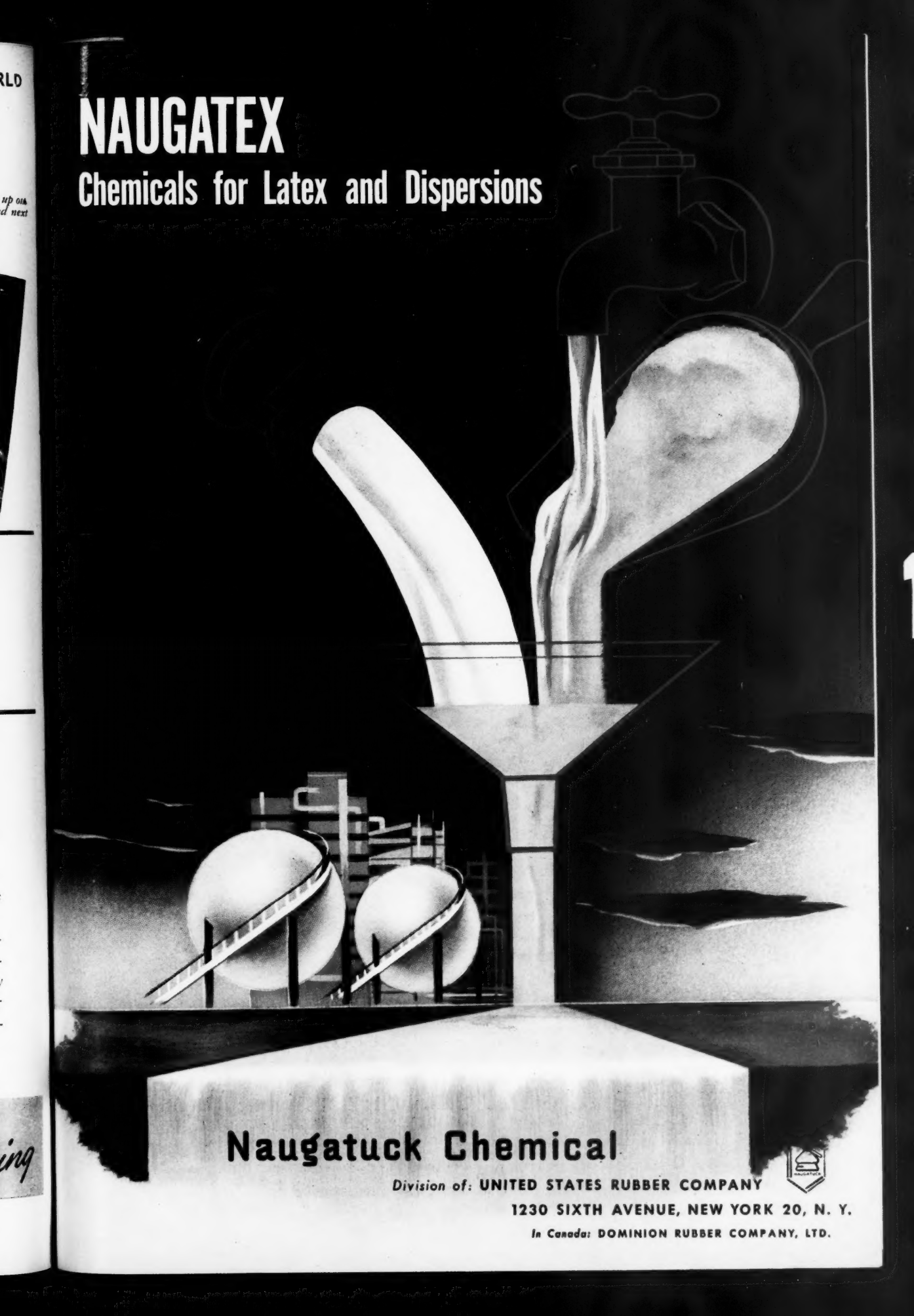
To adapt to changing production flow conditions, your National Tire Spreader is portable—can be moved from place to place with a lift truck. And its only power requirement is compressed air.

As an added feature, this tire spreader also doubles for inspection purposes, handling tire sizes ranging from 6.00x16 to 11.00x20.

This is another example of National Rubber Machinery Company's creative engineering to equip you better for *greater efficiency* and lower production costs. Write today for further information on this important, profit-packed development.

NATIONAL RUBBER MACHINERY CO.
General Offices: AKRON 11, OHIO

Creative Engineering


NAUGATEX
Chemicals for Latex and Dispersions
Naugatuck Chemical
Division of: UNITED STATES RUBBER COMPANY
1230 SIXTH AVENUE, NEW YORK 20, N. Y.
In Canada: DOMINION RUBBER COMPANY, LTD.

QUALITY CHEMICALS
FOR THE NEW SYNTHETIC RUBBERS

SELECT YOUR RUBBER CHEMICALS
FROM THESE GENERAL CHEMICAL PRODUCTS:

BASIC CHEMICALS
GENERAL CHEMICAL COMPANY
FOR AMERICAN INDUSTRY

Sulfuric Acid: All grades and strengths.

Aluminum Sulfate: To precipitate polymerized synthetic rubbers.

Fluosulfonic Acid: For production of Boron Trifluoride.

Potassium Cyanide—Sodium Cyanide: In production of acrylonitrile rubbers.

Copper Fluoborate—Zinc Fluoborate—Copper Cyanide—Sodium Cyanide: Intermediates for "plating" rubber to metals.

Lead Fluoborate: For lead plating in battery manufacture.

Sulfur: Commercial Rubbermakers' and other grades.

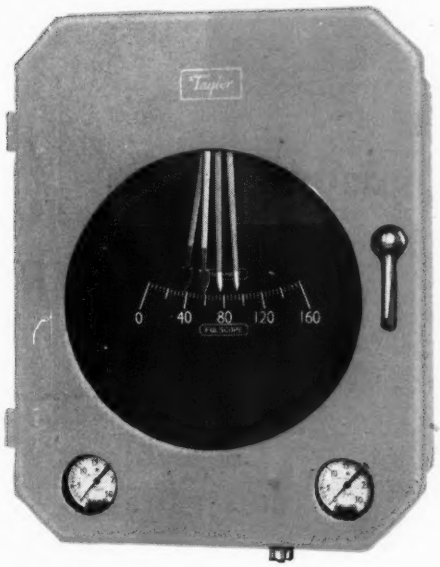
Baker & Adamson Reagents and Fine Chemicals

GENERAL CHEMICAL COMPANY
40 RECTOR STREET, NEW YORK 6, N. Y.

Sales and Technical Service Offices: Atlanta • Baltimore • Boston • Bridgeport (Conn.) Buffalo • Charlotte (N. C.) • Chicago • Cleveland • Denver • Detroit • Houston • Kansas City • Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh • Providence (R. I.) San Francisco • Seattle • St. Louis • Utica (N. Y.) • Wenatchee • Yakima (Wash.)
In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

Why were these Fulscopes painted RED?

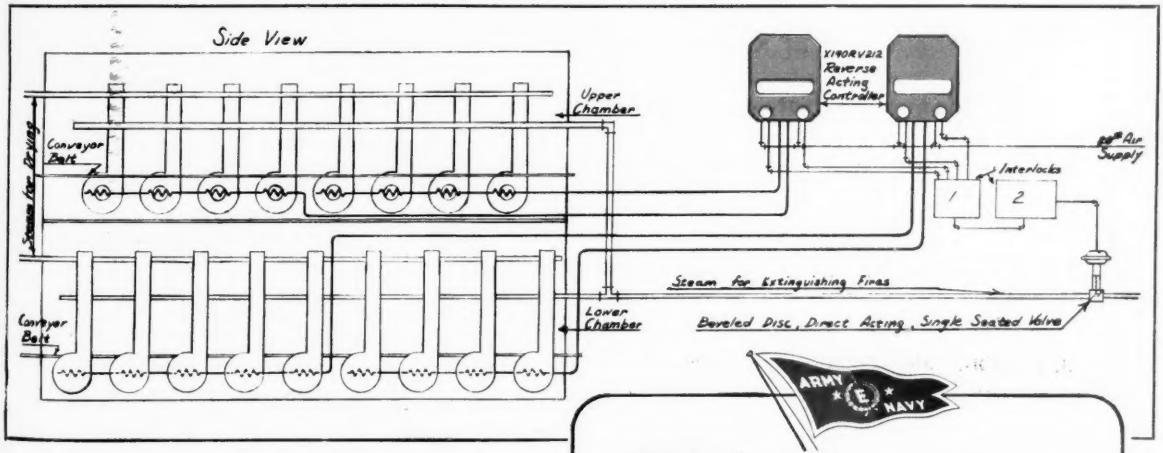


WHY did we paint these Taylor Fulscope Temperature Controllers red? Because they're not temperature controllers in the conventional sense. They're fire extinguishers!

Here's the story: Among the many headaches that came in with synthetic rubber was the problem of how to dry the stuff efficiently, yet be able to quickly extinguish a fire if excess temperatures develop. Taylor Engineers were asked to work out a fire control system utilizing steam as a quenching medium. Resulting system is simple, economical and thoroughly dependable. It works equally well on driers for reclaimed rubber.

The drying is done by centrifugal blowers which force steam-heated air through the particles of synthetic rubber on a screen-like conveyor belt. There are nine blowers in the bottom compartment and eight in the upper, as shown in the drawing below. A capillary bulb is placed in front of the intake to each blower, so that if a fire starts at any point, the Fulscopes immediately detect it and both compartments are flooded with steam.

Maybe you can use this exact hookup. In any case, it's another good example of the versatility of Taylor Fulscopes and Taylor engineering which is yours for the asking. Call your Taylor Field Engineer or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.*



BUY MORE WAR BONDS

—AND KEEP 'EM!

ARMY E NAVY

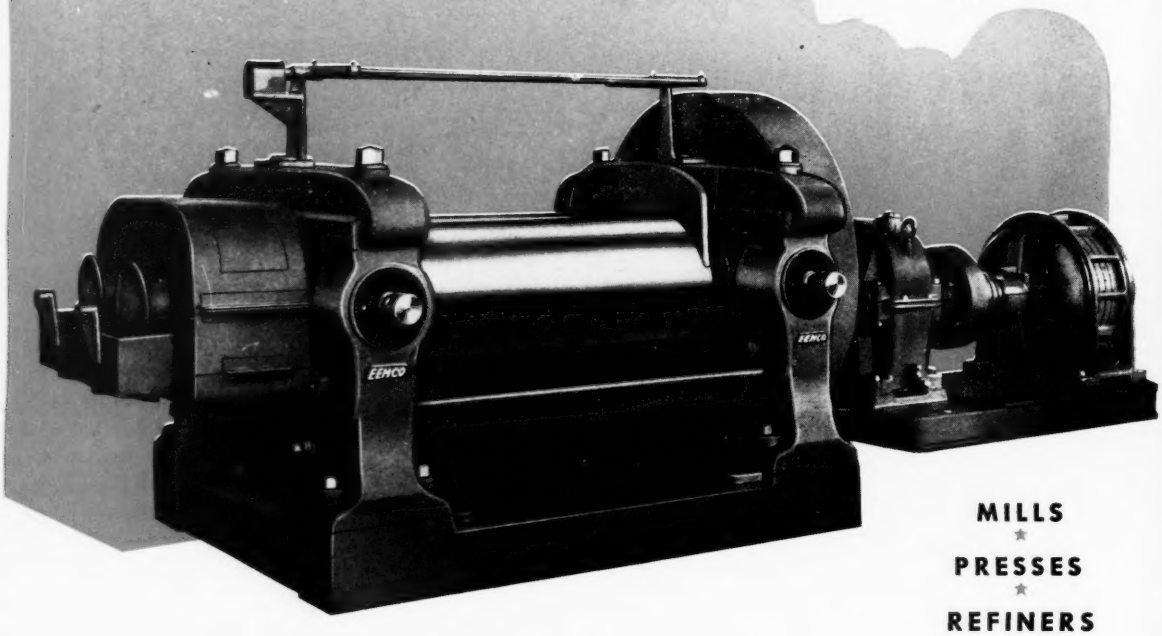
Taylor Instruments MEAN ACCURACY FIRST

IN HOME AND INDUSTRY

Mills *for mixing and compounding*

ALL KINDS OF

RUBBER and PLASTICS



MILLS
★
PRESSES
★
REFINERS
★
WASHERS
★
EXTRUDERS
★
STRAINERS
★
CALENDERS
★
TUBERS
★
CRACKERS

EEMCO has the facilities to assure exceptionally early deliveries of Rubber and Plastics Processing Machinery. Whatever your needs may be it will pay you to call on EEMCO for your requirements.

SALES REPRESENTATIVES

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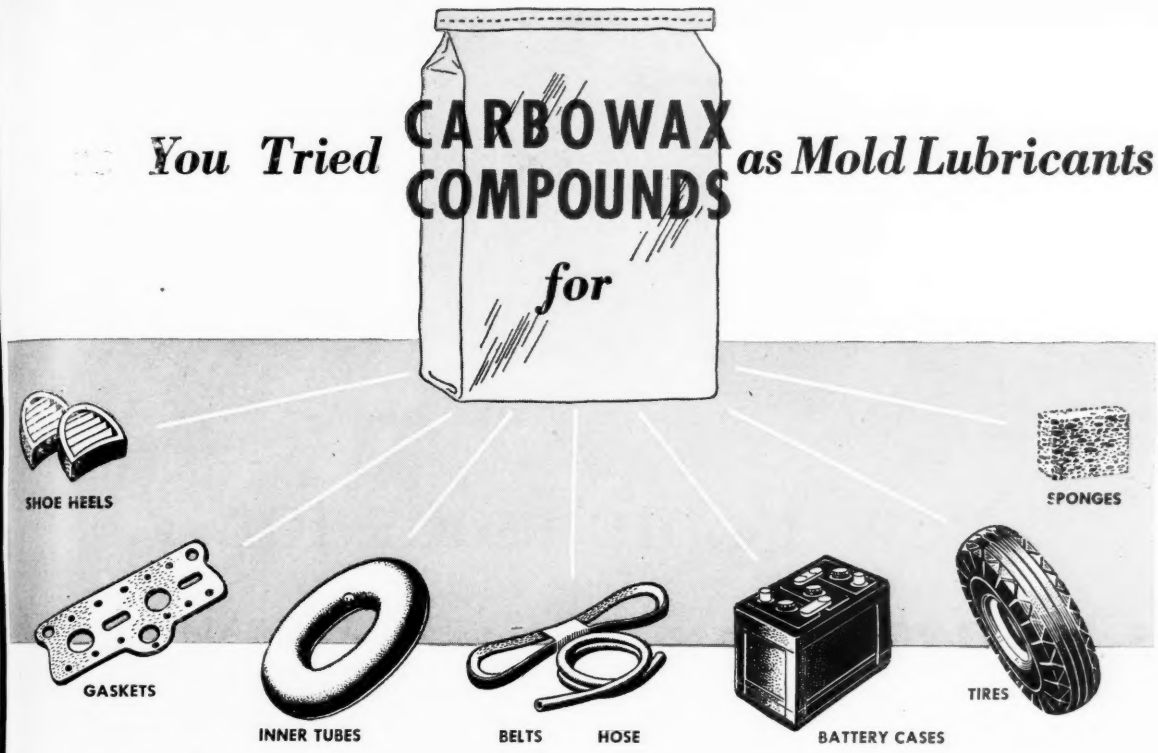
EEMCO ERIE ENGINE & MFG. CO.

953 EAST 12th ST., ERIE, PENNA.

You Tried CARBOWAX COMPOUNDS for as Mold Lubricants



Easy to Apply... Sold as dry flakes, CARBOWAX Compounds 4000 and 6000 are easily dissolved in water to make the ½ to 3 per cent solution to be sprayed or brushed on the mold.

Good Release Properties . . . The cured articles are easily removed from the molds, and have an excellent surface when these CARBOWAX Compounds are used.

Freedom From Mold Build-Up... CARBOWAX Compound solutions do not break down easily under heat. Little or no residue is left in the mold.

Less Rejects... These lubricants reduce the number of "seconds."

Solutions are Neutral... Unlike soaps, CARBOWAX solutions are non-alkaline.

Can be used with natural, GR-S, Buna N, butyl, and neoprene rubbers.

Write for Samples and Prices

OTHER USES OF CARBOWAX COMPOUNDS

1. ***To provide an anti-static coating*** for rubber belts.
2. ***To prevent adhesion*** between conveyor belts and rubber surfaces.
3. ***To activate*** mercapto-type accelerators.
4. ***To disperse pigments*** in rubber compounding.
5. ***To lubricate*** tire beads.

BUY UNITED STATES WAR BONDS AND STAMPS

SYNTHETIC ORGANIC CHEMICALS

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

UCC

30 East 42nd Street, New York 17, N. Y.

"Carbowax" is a registered trade-mark of Carbide and Carbon Chemicals Corporation.

New Compounds for...

FLOCKING

A completely satisfactory synthetic adhesive for flocking has long been a major problem to rubber chemists and manufacturers. We believe our new synthetic latex base compounds will overcome all of the previous difficulties no matter what method of application is used: — spraying, spreading or doctoring.

Adaptable to both cotton and rayon flock, these compounds are also non-inflammable, water-resistant, and can be pigmented to match the color of the flock or base material. A further advantage is the elimination of any additional extending, mixing, or dilution at your plant: — This General Latex compound is shipped in the form of an aqueous dispersion *ready for use.*

HEAT SEALING

General Latex has developed not one, but *a whole new family of compounds* for heat sealing paper, textiles, imitation leather, and associated products. The base is synthetic latex, but the other ingredients are varied in the compounding to fit the particular requirements of temperature, penetration, strength of bonding, flexibility, adaptation to unlike surfaces, and all other factors pertinent to the application.

These compounds are not carried in stock but can be supplied on short notice, tailor-made to your individual requirements. For a thorough analysis of any heat sealing problem you may have, we suggest that you get in touch with our laboratory.

GRS latex types, 2, 3 and X-160, normal and concentrated, available from stock.

A Complete Service to Manufacturers

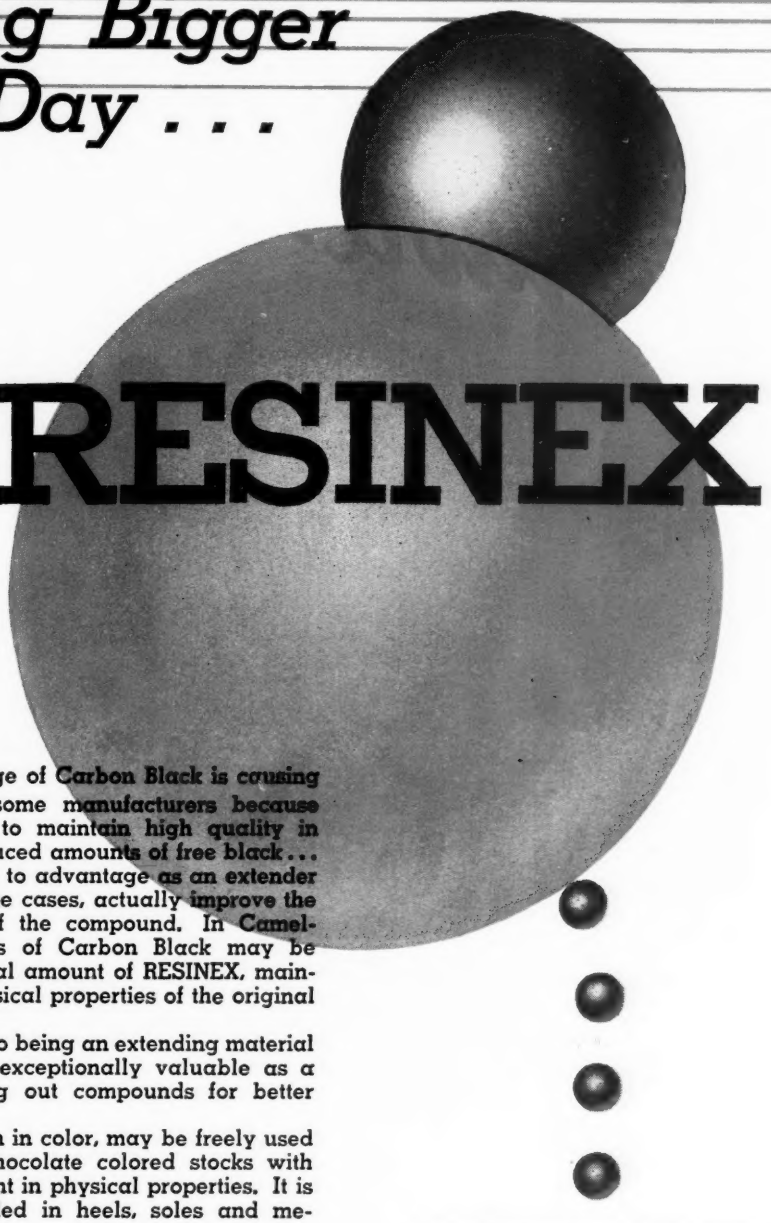
RESEARCH • MATERIALS • ENGINEERING • MANUFACTURE

General Latex & CHEMICAL CORP.

666 MAIN STREET, CAMBRIDGE, MASS.

Agents for Rubber Reserve Company for storage and distribution of natural rubber latex. Distributors for Rubber Reserve Company for synthetic latex. Operators of the Government-owned Baytown, Texas, synthetic rubber plant in collaboration with the General Tire & Rubber Co.

Looming Bigger Every Day . . .



RESINEX

TODAY the shortage of Carbon Black is causing less distress to some manufacturers because RESINEX is helping to maintain high quality in compounds using reduced amounts of free black . . . RESINEX can be used to advantage as an extender to maintain or, in some cases, actually improve the physical properties of the compound. In Camelback, up to 10 parts of Carbon Black may be replaced with an equal amount of RESINEX, maintaining the major physical properties of the original compound.

RESINEX, in addition to being an extending material for Carbon Black, is exceptionally valuable as a plasticizer — smoothing out compounds for better extrusion.

RESINEX, being brown in color, may be freely used in brown, tan and chocolate colored stocks with noticeable improvement in physical properties. It is especially recommended in heels, soles and mechanical goods.

Samples of RESINEX will be supplied on request. We offer the assistance of our technical staff in working out compounding problems.

RESINEX is available for immediate large-volume uses.

In GR-S Tread Compounds . . .

RESINEX provides an excellent extending material when used in reasonable amounts. The amount of Carbon Black eliminated may be replaced by RESINEX on a pound for pound basis, with improved resistance to cut-growth.

STANDARD Chemical Company

General Offices: AKRON 8, OHIO

New England Sales Office: 335 Chamber of Commerce Bldg., Boston, Mass.

Available Now!

NOVAC

(Selenium dibutyl dithiocarbamate)
Liquid

NOVAC A-13

1 Part Novac
(3 parts bensothiazyl disulfide)
Dustless Powder

Non-Dusting
Improved Dispersion
Good Aging

RUBBER H AND M PIGMENTS Chemicals

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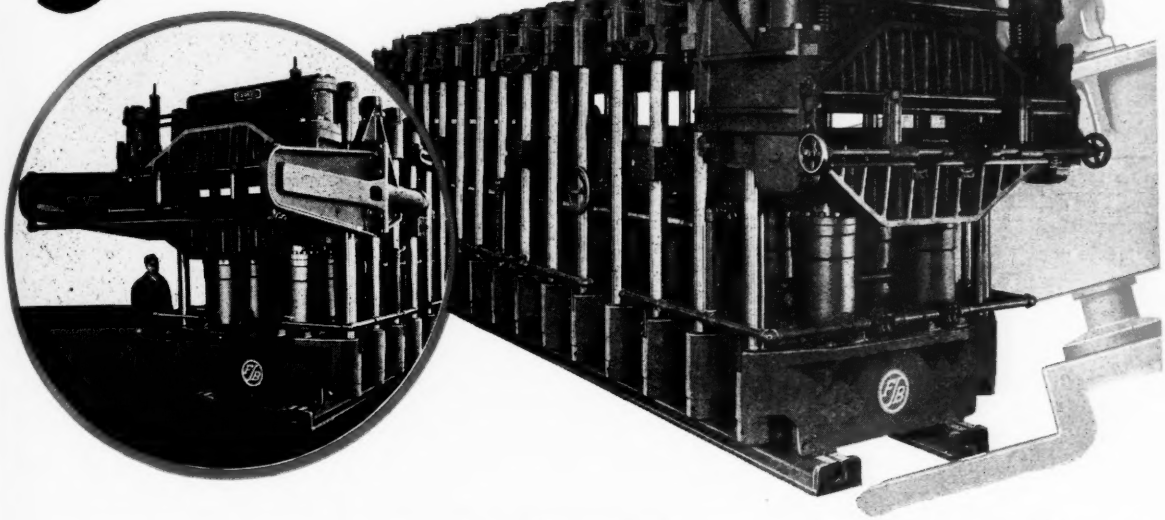
82 BEAVER ST., NEW YORK 5, N. Y.
516 OHIO BUILDING, AKRON, OHIO
SUPPLIERS OF RUBBER CHEMICALS

BELT PRESS with a 3164 TON SQUEEZE



This Farrel hydraulic belt press, 78 inches wide by 30 feet long, exerts a pressure of 225 pounds per square inch of platen surface—a total load of 3,164 tons—by means of twenty-eight 12-inch diameter rams operating under an initial water pressure of 2,000 pounds per square inch.

Here are some of the design features which insure accuracy and permanence of alignment, improve quality of output, reduce maintenance expense and make this press an efficient rubber processing unit:

1. Crossheads, cylinders, tie rods and other parts are made of high strength materials of ample weight and section to provide the strength and rigidity for minimum deflection. Accurately ground rams of hard chilled iron contribute to long life and trouble-free operation.
2. To prevent endwise movement of the follower platen it is secured at the center by guides located on one tie rod on each side. Since the platen is held at the center only, it is free to expand in both directions. Other guides on a pair of tie rods near each end prevent sidewise movement.
3. A positive equalizing device connected with the follower crosshead keeps the bottom platen level when the press is opening or closing.
4. An improved design of hydraulic stretcher and clamps confines the stretching load to the top and bottom platens. No forces are imposed on the press structure itself.
5. To insure uniform heating of the platen surfaces the platens are drilled for steam circulation in several separate sections. The bottom platen is fitted with edge guides which are adjustable by easily accessible handwheels attached to the side of the follower crosshead.

Farrel engineers are available to help you with your rubber processing problems. They will be glad to tell you more about this press or any of the other equipment listed on this page.

F-B PRODUCTION UNITS

Banbury Mixers
Plasticators
Pelletizers
Mixing, Grinding, Warming and Sheeting Mills
Bale Cutters
Tubing Machines
Refiners
Crackers
Washers
Calenders
Hose Machines
Hydraulic Presses and other rubber working equipment.

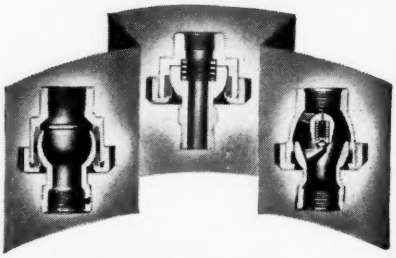
FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.
Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles

Farrel-Birmingham

Indispensable Fluid Control

THROUGH RESPONSIVE MOVEMENT

Modern industry and modern transportation alike depend on controlled circulation of vital fluids . . . oil, gases, water, steam. For these arterial systems, Barco Flexible Joints have provided necessary protection for over 30 years . . . guarding these mechanical "life-lines" against vibration and shock . . . compensating for contraction and expansion. For complete information, write to Barco Manufacturing Company, Not Inc., 1810 Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal, Canada.



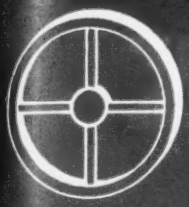
BARCO ***FLEXIBLE JOINTS***

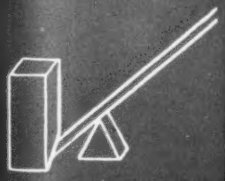
THE FREE ENTERPRISE SYSTEM IS THE SALVATION OF AMERICAN BUSINESS

Not just a swivel joint . . . but a combination of a swivel and ball joint with rotary motion and responsive movement through every angle.

"MOVE IN EVERY DIRECTION"

"BASIC TOOLS" FOR THE RUBBER INDUSTRY





Sharples Amines

FOR USE IN THE FIELD OF RUBBER CHEMICALS

Commercial Products

Mono-, Di- and Tri-Ethylamines
Mono-, Di- and Tri-Butylamines
Mono-, Di- and Tri-Amylamines
Ethyl Monoethanolamine
Ethyl Diethanolamine
Diethylaminoethanol
Butyl Monoethanolamine
Butyl Diethanolamine
Dibutylaminoethanol

Semi-Commercial or Laboratory Products

Mono-, Di- and Tri-Propylamines
Mono- and Di-Isopropylamines
Mono-, Di- and Tri-Isobutylamines
sec-Butylamine
Mono- and Di-Hexylamines
Mono- and Di-Octylamines
N-Ethyl-N-butylamine
4-Amino-2-butanol
1, 3-Diaminobutane
p-tert-Amylaniline

Sharples offers a wide variety of amines as "basic tools" for the research chemist engaged in the development of auxiliary rubber chemicals. Several of the commercial products in the above list are being used extensively in the production of compounding agents for both natural and synthetic rubbers. All merit consideration as intermediates for the synthesis of new derivatives which may prove to be the solution to many problems growing out of the development of new synthetic polymers now available to the rubber industry.

Samples of any that appear to be of potential interest will be sent upon request. Sharples will be glad to cooperate in their evaluation.

SHARPLES TRADE MARK CHEMICALS

SHARPLES CHEMICALS INC.

PHILADELPHIA • CHICAGO • NEW YORK

PELLETEX and GASTEX

Semi-Reinforcing Furnace Blacks

INCREASED PRODUCTION

The uniformity of Gastex and Pelletex enables manufacturers to produce more uniform products in greater volume.

GENERAL ATLAS CARBON CO.

PELLETEX TRADE MARK

GASTEX

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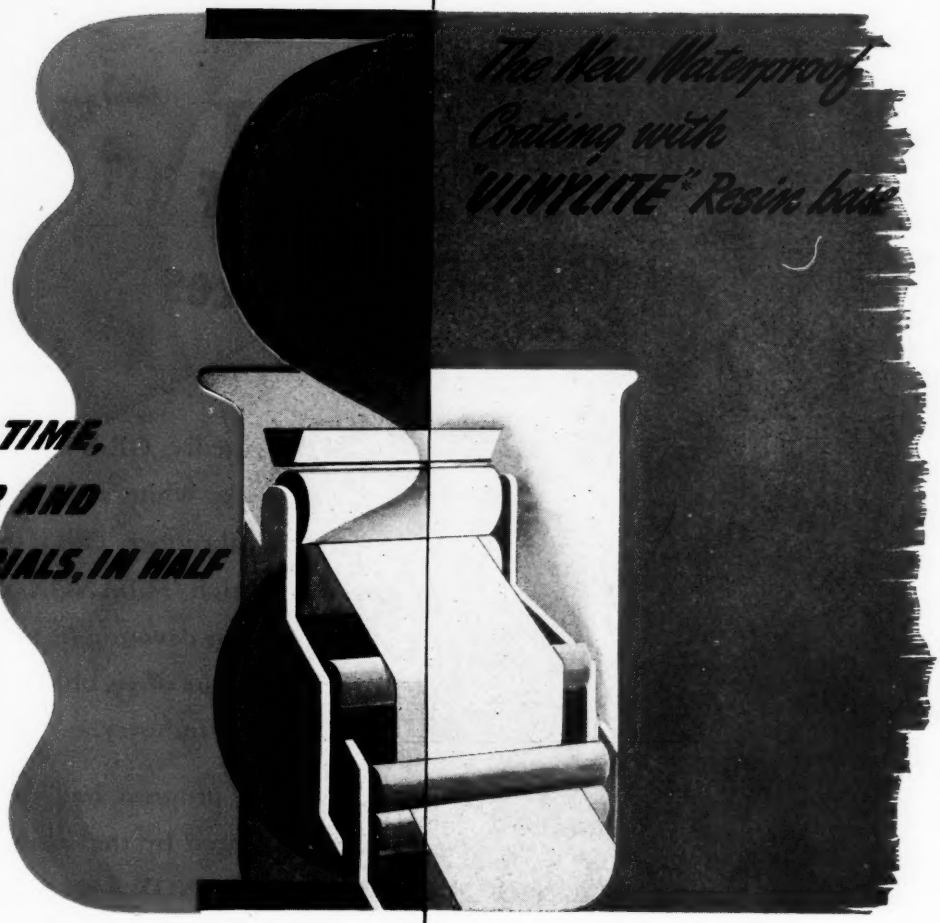
RUBBER H AND M PIGMENTS Chemicals

FUZON-O

The New Waterproof Coating with "VINYLITE" Resin base*



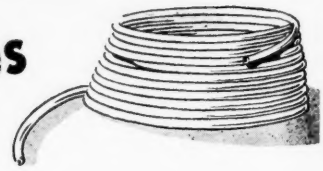
CUTS TIME, LABOR AND MATERIALS, IN HALF

Does the coating on your product LOOK different lately? It does if you use one based on "Vinylite" resins . . . and it ACTS different, too. For example, "Vinylite" resins resist oil, grease, alkali and acid . . . withstand the oxidizing effects of the air and the photochemical effects of sunlight . . . are exceptionally immune to moisture, abrasion, and temperature variation. FUZON-O, the new "Vinylite" resin base formulation, cuts cost three ways . . . makes this amazing plastic coating available for use on cotton, nylon and glass fabrics . . . and other materials. For complete information about FUZON-O address the Stanley Chemical Company . . . manufacturers of Stanley Lacquers, Enamels, Synthetics and Japans . . . East Berlin, Connecticut.

*Trade Mark Carbide and Carbon Chemicals Corporation

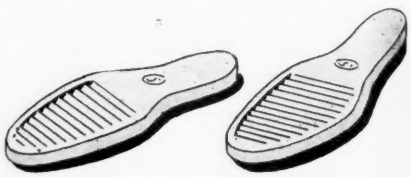
Stanley Chemical

THE *Whitening* EFFECT OF TITANOX Is Visible In Many Places



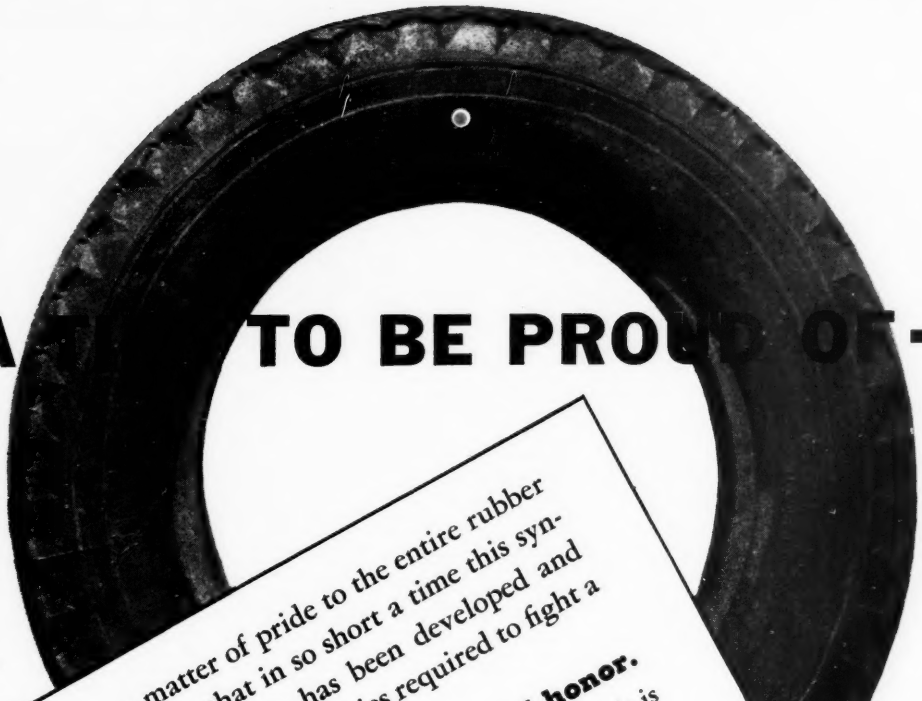
Admittedly, GR-S is much harder to make white and bright than is natural rubber. This is the problem to which TITANOX rubber research is devoting its major efforts, conscious of its obligation to the Rubber Industry.

Much progress has been made as evidenced by the whitening effect of TITANOX pigments in so many articles for war and civilian use. In GR-S, as in natural rubber, TITANOX pigments give the highest whiteness obtainable.



TITANOX
REG. U. S. PAT. OFF.

TITANIUM PIGMENT CORPORATION
SOLE SALES AGENT
111 Broadway, New York 6, N. Y.
104 South Michigan Ave., Chicago 3, Ill.
350 Townsend St., San Francisco 7, Cal.
2472 Enterprise St., Los Angeles 21, Cal.



A[illegible] TO BE PROU[illegible] OF—

IT is a matter of pride to the entire rubber industry that in so short a time this synthetic rubber tire has been developed and supplied in the quantities required to fight a global war.

The RED DOT is a badge of honor.

The RED DOT on this tire indicates that it is made from synthetic rubber.

This same RED DOT is a protection for the user of reclaimed rubber. By means of it reclaimers are able to separate natural rubber tires from synthetic rubber tires when they eventually reach the scrap pile.

Both materials make good reclaims, provided they are handled separately, by the particular process each requires.

The RED DOT is your protection and ours, as well as a mark of achievement.

PEQUANOC RUBBER CO.

QUALITY RECLAIMS FOR SPECIFIC PURPOSES

BUTLER — Factory and Main Office — NEW JERSEY

SALES REPRESENTATIVES

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Back Bay, Boston, Mass.

Burnett & Co. (London) Ltd.
46 Herga Court
Harrow-on-Hill, Middlesex, England

What you should know about

VISTAC

TACKIFIERS

PLASTICIZERS

MODIFIERS

Improves the tack, adhesion, moisture-proof qualities of:

GR-S

ASPHALTS

WAXES

VISTANEX POLYBUTENE

RECLAIMED RUBBER

SPECIAL-PURPOSE, SYNTHETIC, RUBBER-LIKE MATERIALS

VISTAC — A group of viscous, tacky plasticizers for rubber, reclaimed rubber, various synthetics. Produces soft stringy tack characteristics in adhesives based on GR-S, Vistanex Polybutenes.

VISTAC #1 — A wholly synthetic hydrocarbon polymer, is a true liquid of extremely high viscosity, nearly water white in color, with extremely good compatibility characteristics in rubber and synthetic rubber. It is particularly valuable in combination with Vistanex Polybutene. Is also widely used in blends of GR-S and reclaim.

VISTAC A — A bright amber colored, extremely high viscosity liquid. It normally produces greater tackiness than does Vistac #1. Vistac A has the lowest viscosity index of the Vistac group of plasticizers. Vistac A is freely available without allocation.

VISTAC P — An amber colored liquid of very high viscosity, a pure hydrocarbon. Vistac P is an outstanding tackifier for Vistanex base adhesive compounds and works well with blends of GR-S and reclaim. Vistac P has the highest viscosity index of the Vistac group of plasticizers. Vistac P is available freely without allocation.

All grades of Vistac may be used in dry mill or mixer compounding of Vistanex, GR-S and reclaim to produce desirable plasticity and tackiness with good aging characteristics. All may be emulsified into water to make a base to be blended with natural latex, reclaim dispersions, and GR-S latices.

ADVANCE SOLVENTS & CHEMICAL CORP.

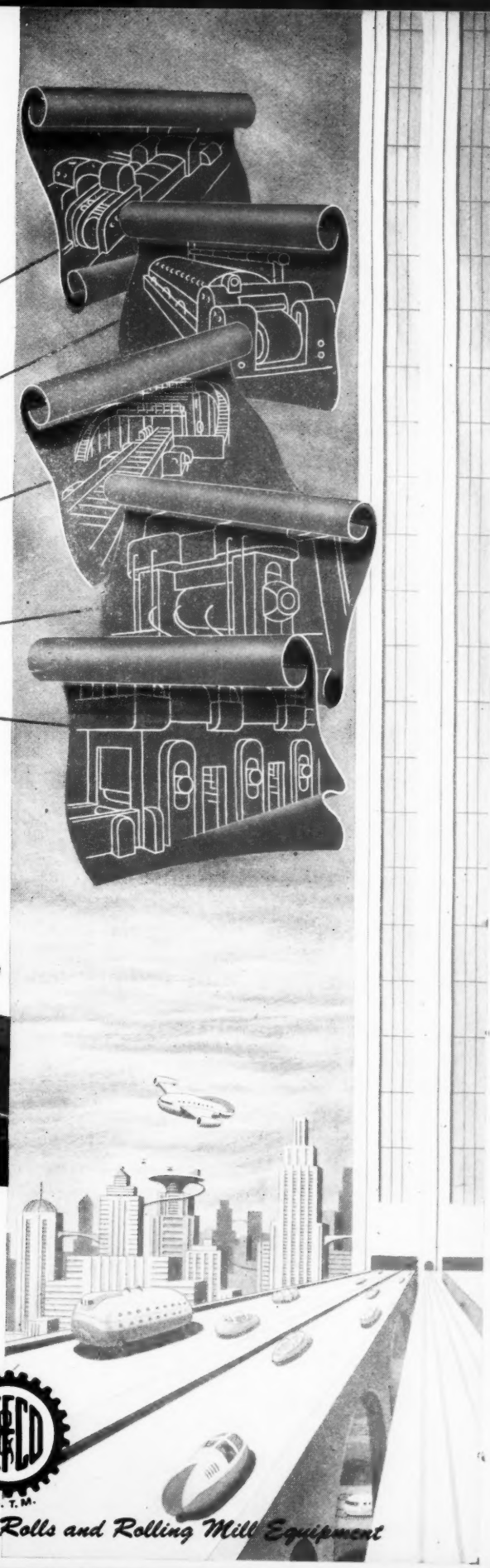
245 Fifth Avenue New York, N. Y.

UNITED'S engineers, outstanding contributors the progress of the rolling industry for the past 40 years, today engaged in developing improved processes and chinery to meet tomorrow's radically advanced and highly petitive manufacturing requirements.

Executives charged with reconversion to the economical cessing of metals, rubber or synthetic resins, should estigate UNITED'S ability to serve them, whether their blem is the replacement of present worn-out equipment; construction and installation of modern processes within ir present plants; or the design and erection of completely w, fully equipped plants.

Thoroughly experienced engineering and research staffs s the productive capacity of UNITED'S six great manu- turing organizations are at the service of the industry.

shape of things to come



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THE RUBBER INDUST

AERO* Brand—Acrylonitrile; DOTG and DPG; Dibutyl-Phthalate; Rubber Sulphur; Casein.

ACCELERATOR #49—Accelerator for natural rubber, and activator for primary accelerators for GR-S.**

AERO AC 50—Delayed action activator for the thiazole type of accelerators.**

AERO AC 165—Self-activating accelerator for GR-S.**

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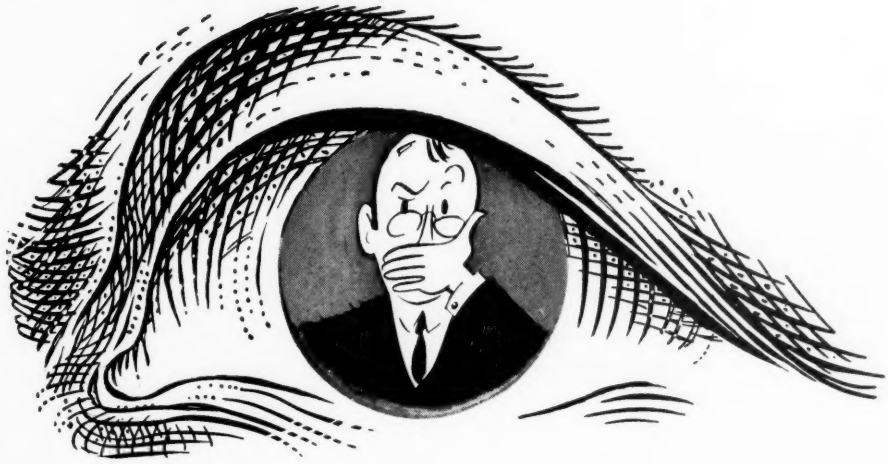

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Do you see the advantages of:

Chilling water to maintain required temperatures for improving plasticity and tenacity?

Controlling water temperatures to prevent premature curing?

Chilling water to prevent "sticking"?

Speeding of production by controlling temperatures with chilling water?

Chilling water to condition air and thereby remove the weather variable?

EASY ANSWER:

SATISFACTORY solutions of the rubber industry's special problems in air conditioning, refrigeration and unit heating have been notable achievements of Carrier — over many years. Carrier's trained engineering staff and exceptional technical facilities are at your service now— for expert counsel and cooperation on present or post-war needs. No obligation whatever. Write fully today.

Carrier Corporation, Syracuse, N.Y.

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INDUSTRIAL HEATING

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RUBBER RECLAIMERS TODAY!

AC-CENT-TCHU-ATE THE POSITIVE

E-lim-my-nate the negative.*

You ACCENTUATE THE POSITIVE in securing rubber scrap by dealing with The Loewenthal Co. who have been in the rubber field since 1868 and have served the rubber reclaiming industry since its inception with positive results due to expert knowledge gained through experience.

You ELIMINATE THE NEGATIVE by avoiding errors due to inexperience and carelessness, for The Loewenthal Co. always meets specifications.

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JACK SIDER, *President* J. K. McELLIGOTT, *Exec. Vice-Pres.*

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Cable Address: "Gyblowell"

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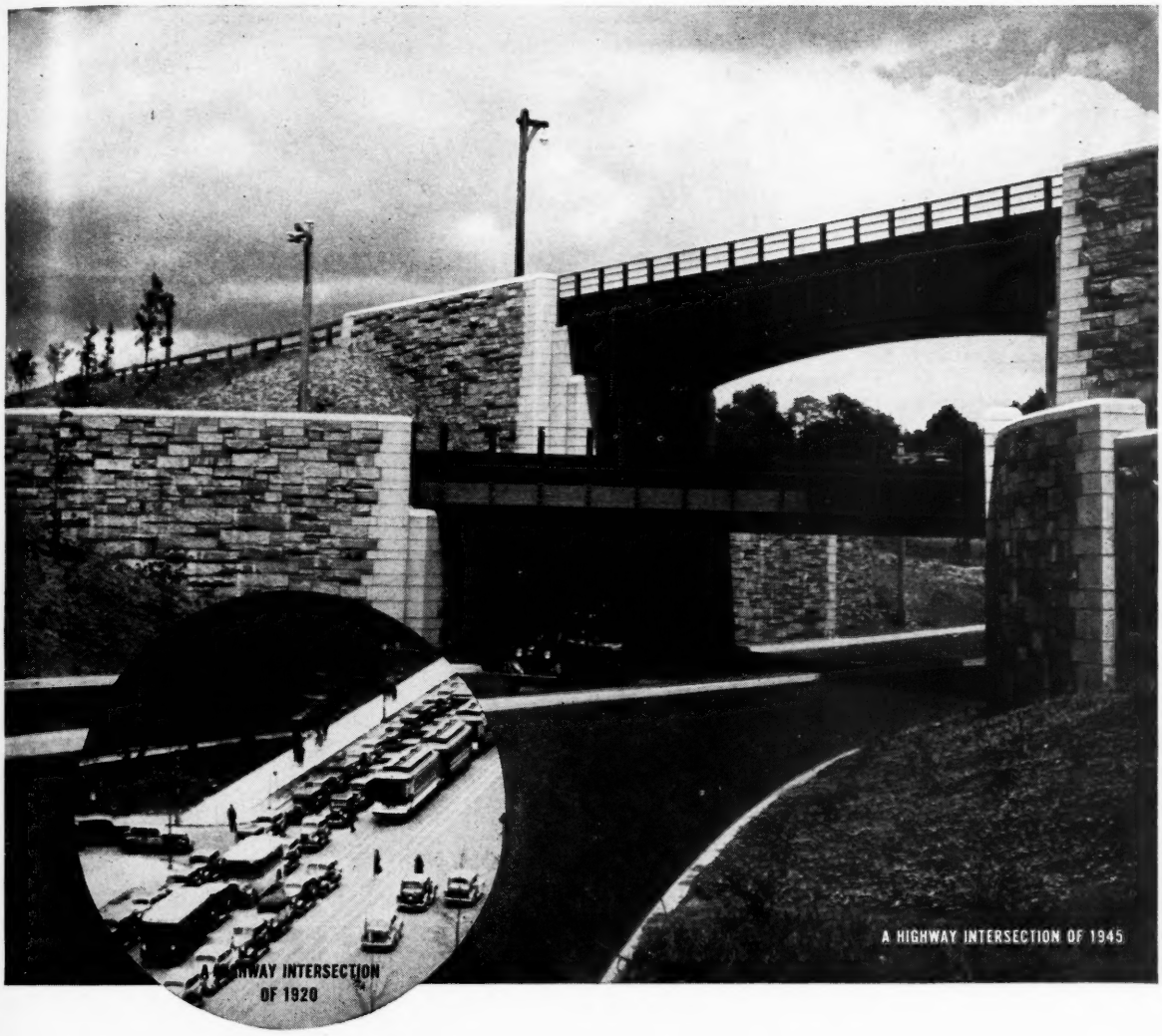

A Twenty-Five Year Perspective

America has come a long way since 1920 in the appearance and efficiency of its roads and highways. New superhighways of practical and time-saving design have solved many of the difficult problems of traffic control, combining speed with greater freedom of movement and safety. Yet this is but a start of a pattern that will be followed out in the expanding postwar years.

America has come a long way chemically, too, in this twenty-five years. Founded in 1920, Witco has expanded with the chemical industry . . . helped to solve many of the pressing problems associated with its development . . . and provided many new and improved chemical products that have benefited other industries. Today, Witco is ready with increased experience and facilities to meet postwar needs.

If you use chemicals, pigments, sealing compounds, asphalt specialties or similar materials, call on Witco for modern service plus efficient technical cooperation and research assistance.

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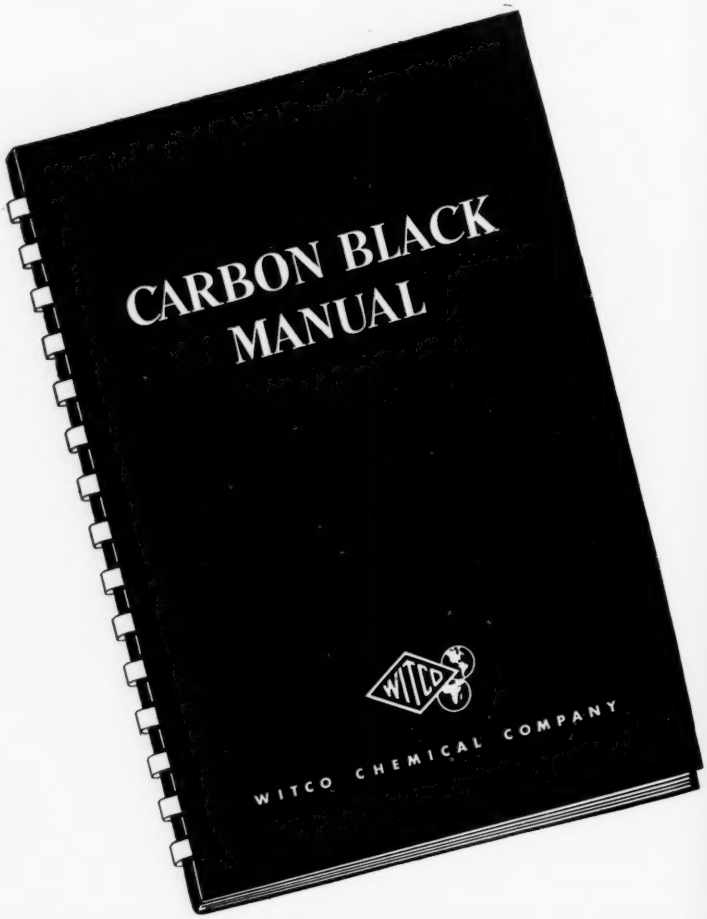

Here is the new Witco Carbon Black Manual, a comprehensive, up-to-date text on the properties and applications for the wide range of Channel and Furnace type Carbon Blacks manufactured and supplied by Witco.

This new manual contains carefully compiled information of immediate and lasting value to both rubber compounders and buyers of rubber processing materials.

It is yours for the asking.

COMPLETE, too, are Witco's lines of both Channel and Furnace Type Blacks. They cover carbon black need for the compounding of both natural and synthetic rubber. In addition, Witco offers wide variety of other materials for use in rubber production, among which are:

- **FILLERS**
- **SOFTENERS**
- **DISPERSING AGENTS**
- **ACCELERATORS**
- **ACCELERATOR ACTIVATORS**
- **COLORS**
- **AND OTHER PRODUCTS**

Full information on these products is contained in our booklet, WITCO PRODUCTS, which is also yours for the asking.

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- RESINS

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Flintkote technical men will work right along with your own staff . . . studying, developing and perfecting, from laboratory to finished product.

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SYNTEX PRODUCTS
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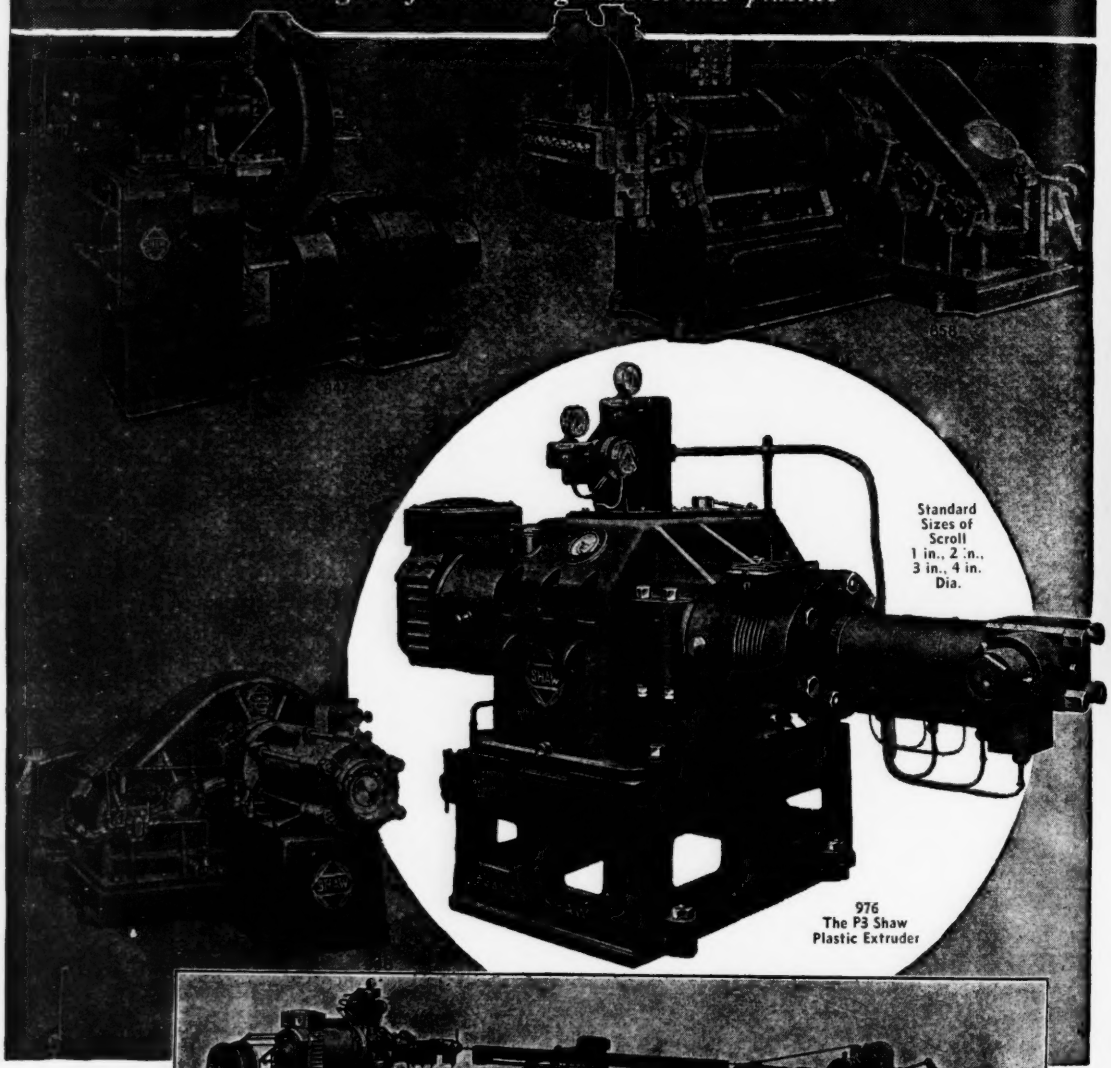
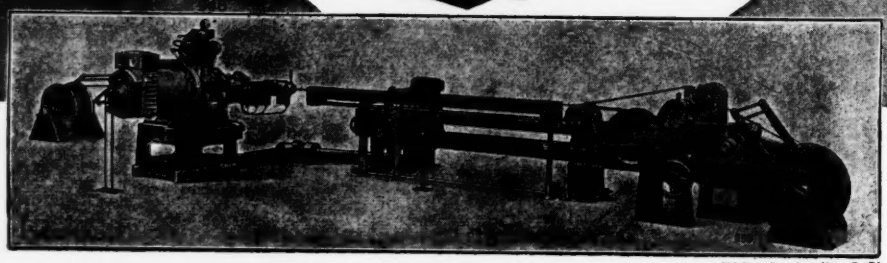
SHAW RUBBER EXTRUDERS HAVE BEEN OUTSTANDING FOR OVER 60 YEARS

The latest addition to the range is an extruder specially designed for handling Rubber-like plastics



Standard Sizes of Scroll 1 in., 2 in., 3 in., 4 in. Dia.

976 The P3 Shaw Plastic Extruder



The P2 Extruder With Unit Driven Haul Off & Wind Up Gear . . . . .

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Each process from the raw material to the finished product is under the closest supervision. That's why there is only one grade—one quality of K&M Light Magnesium Oxide. Your problem of selecting a particular grade is, therefore, eliminated. This one grade meets the most exacting requirements.

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LOS ANGELES, CAL., H. M. Royal, Inc.
TRENTON, N. J., H. M. Royal, Inc.

BARDOL*

What is it?

Bardol is a Barrett Rubber Compounding Material; a refined coal-tar oil which is liquid and free-flowing at 40°F.

What will it do?

It exhibits excellent performance as a softener and plasticizer especially when used with GR-S. It is a particularly fine processing agent and is highly effective in dispersing blacks.

How can it be used?

Its use in various proportions provides a variety of desirable properties. Shown below are typical Bardol recipes.

	A	B	C	D
GR-S	100.00	100.00	100.00	100.00
Bardol	0.00	10.00	20.00	30.00
EPC Black	50.00	50.00	50.00	50.00
Zinc Oxide	3.00	3.00	3.00	3.00
"Agerite" Powder	1.00	1.00	1.00	1.00
Sulfur	1.75	1.75	1.75	1.75
"Santocure"	1.20	1.20	1.20	1.20

The effects of Bardol in these recipes are demonstrated by the accompanying tests:

MOONEY PLASTICITY
(3 min. shear at 100°C)

Bardol Content	0	10	20	30
	90	66	52	46

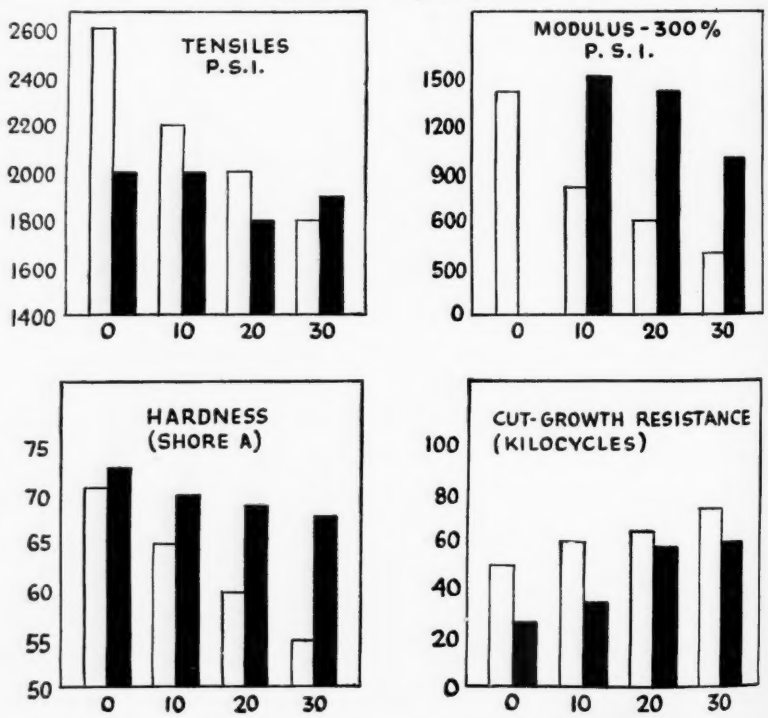
Note: In the accompanying charts the difference between aged and unaged stocks is represented by:

Unaged

48 hrs.: 100°C

ALL CURES

60 min. at 281°F (35 lbs.)



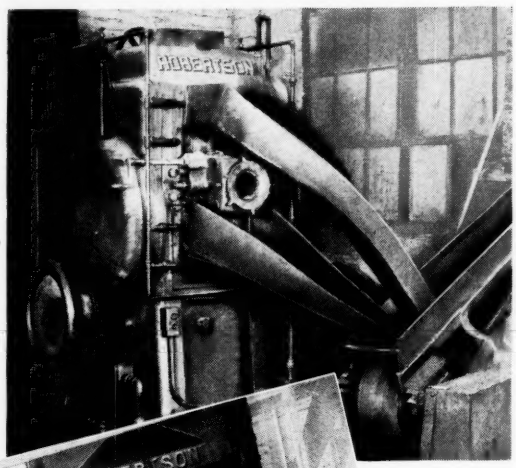
THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

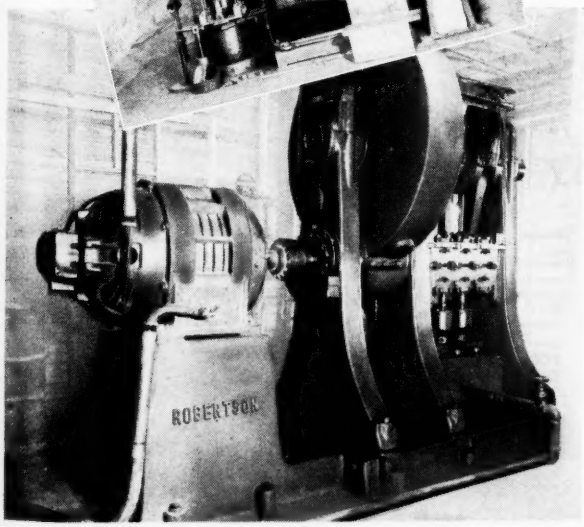
In Canada: The Barrett Company, Ltd., 5551 St. Hubert Street, Montreal, Que.

Barrett

*Trade-mark Reg. U. S. Pat. Off.

THE Swan RUBBER COMPANY





-another leading user of

ROBERTSON

equipment

These photographs show the second complete Robertson installation at the Swan Rubber Co., Bucyrus, Ohio.

Equipment includes: A 2100-ton Lead Hose Encasing Press (Center photo), Lead Stripping Machine (Top photo), Hydraulic Pump (Lower photo) and Lead Melting Pot, with billet moulds.

Used by the majority of makers of rubber hose in the Western Hemisphere, Robertson machines are widely recognized as matchless in quality and performance. The fact that they are not mass-produced, but practically TAILORED for the particular job required, is one reason why Robertson machines have enjoyed for 87 years the distinction of leadership in their field.

JOHN Robertson COMPANY INCORPORATED

125-135 WATER STREET, BROOKLYN 1, NEW YORK

Designers and Builders of all Types of Lead Encasing Machinery

Since 1858

HARDESTY DIBUTYL SEBACATE

means

HIGHEST PLASTICIZING POWER

The main purpose of a plasticizer is to impart flexibility to plastic materials and elastomers. In this property, Hardesty Chemical Dibutyl Sebacate is one of the most efficient plasticizers known. This is strikingly shown in the following table giving the properties of test strips of Vinylite VYNW containing three different plasticizers. The basic formulation used in making these strips consisted of 100 parts of Vinylite VYNW, 55 parts of plasticizer, 2 parts of calcium stearate, and 0.75 part of stearic acid. This mixture was milled on a two-roll mill with roll temperature of 300-310°F., and then molded for ten minutes at 300°F. and chilled under pressure.

These properties show the outstanding plasticizing power of Hardesty Chemical Dibutyl Sebacate. This plasticizing power is retained at extremely low temperatures, as shown by the cold cracking tests in the table below.

Hardesty Chemical Company Dibutyl Sebacate is used as a plasticizer for the vinyl copolymers, polyvinyl chloride, polyvinyl butyral, nitrocellulose, cellulose acetobutyrate, acrylic resins and synthetic rubbers.

In addition to its high plasticizing power and low temperature flexibility, Dibutyl Sebacate is also characterized by its high solvency for various elastomers. It is extremely resistant to yellowing on long exposure to light, tasteless and has no residual odor.

A letter to Hardesty Chemical Company will bring a sample and further information by return mail.

Plasticizer	Modulus at 100% Elongation	Tensile at Break	Elongation	Set	Shore Hardness	Cold Cracking Temperature
Dibutyl Sebacate	584 p.s.i.	2220 p.s.i.	405%	50%	62	Below — 80°F.
Dioctyl Phthalate	1075 p.s.i.	2795 p.s.i.	465%	39%	79	—45°F.
Tricresyl Phosphate	1780 p.s.i.	3150 p.s.i.	285%	27%	85	0°F.

Properties of Dibutyl Sebacate

Purity	98.5% minimum
Specific Gravity	0.935 20/20°C.
Acidity as Sebacic	0.3% maximum
Color	Light straw
Sediment	None
Ash	0.001% maximum
Copper	None
Iron	0.3 ppm maximum
Butanol	0.1% maximum
Flash Point	380°F.
Fire Point	420°F.
Boiling Point	344°C. at 760 mm. 175-180°C. at 3 mm.
Water solubility	Less than 1% at 25°C.
Freezing Point	11°F.
Weight per gallon	7.8 lbs.
Index of Refraction	1.4391 at 25°C.
Dielectric Constant	3.6
Power Factor—60 cycles	.6

HARCHEM

PLASTICIZERS

Alkyl Roleates

Dibutyl Sebacate

Capryl Alcohol

Binney & Smith Co., exclusive agents for the rubber industry

HARDESTY CHEMICAL COMPANY, INC., 41 EAST FORTY-SECOND STREET, NEW YORK 17, N.Y.

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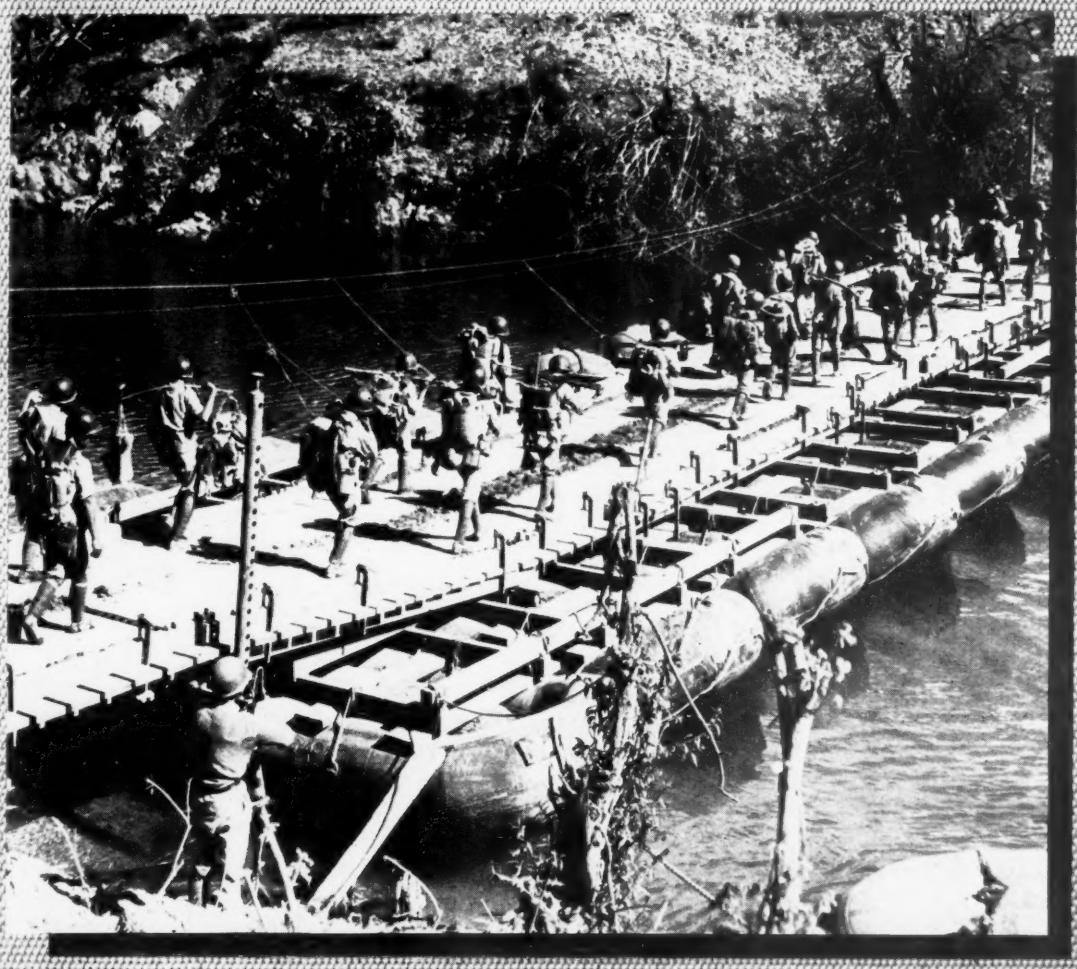
ASSOCIATED WITH UNIFORM QUALITY FOR OVER HALF A CENTURY



Backbone for a Rubber Bridge

Official U. S. Army Photo

Putting backbone into rubber products calls for fabrics with a high degree of uniformity. That's where the careful production of Mt. Vernon fabrics comes in to bridge the gap between good rubber products and better rubber products. Close laboratory control guides every step in the production of Mt. Vernon fabrics toward higher uniformity . . . selecting only top grades of cotton for greater strength and durability. When specifications call for more uniform fabrics, you will find them in Mt. Vernon brands.

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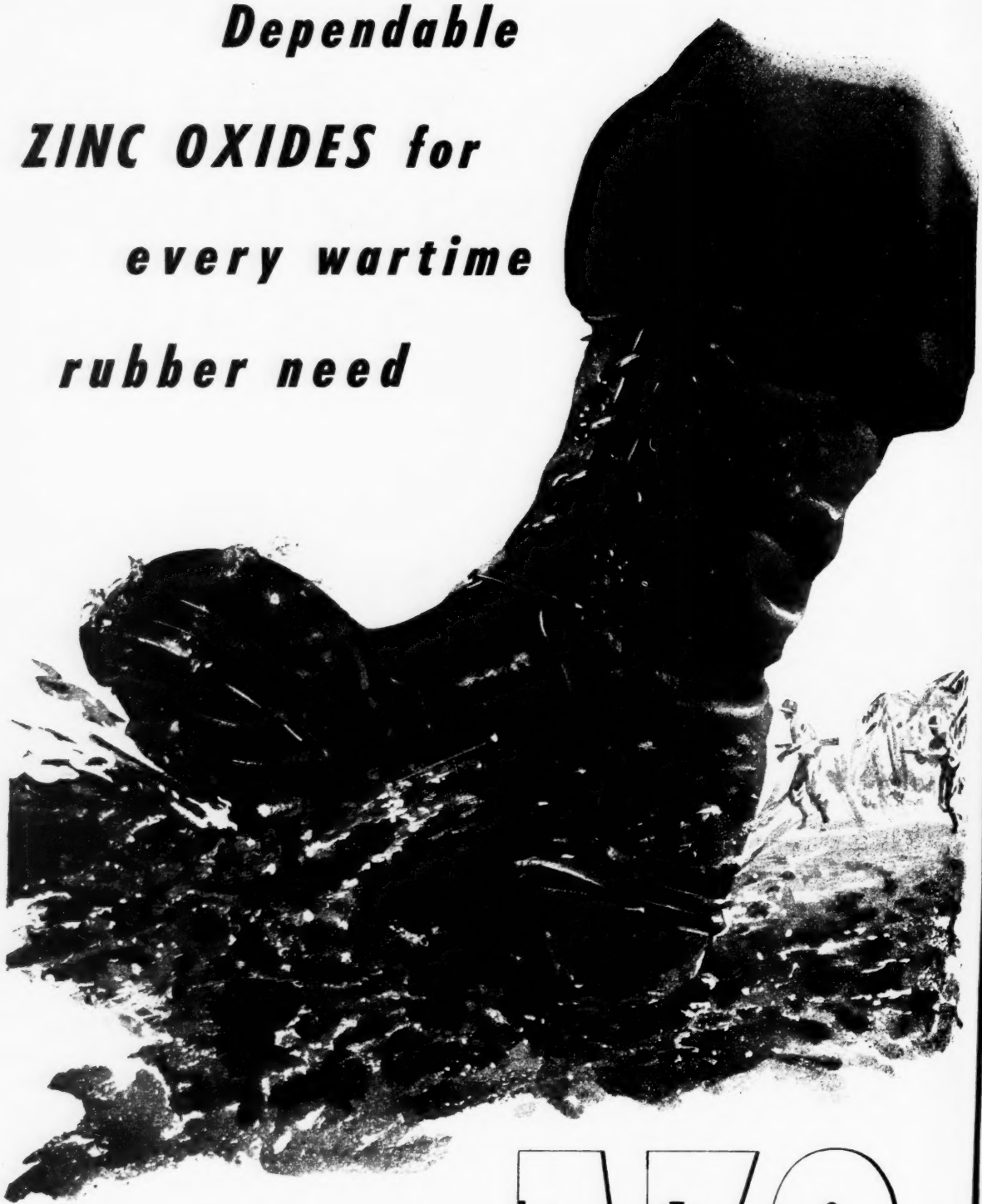
Dependable ZINC OXIDES for every wartime rubber need



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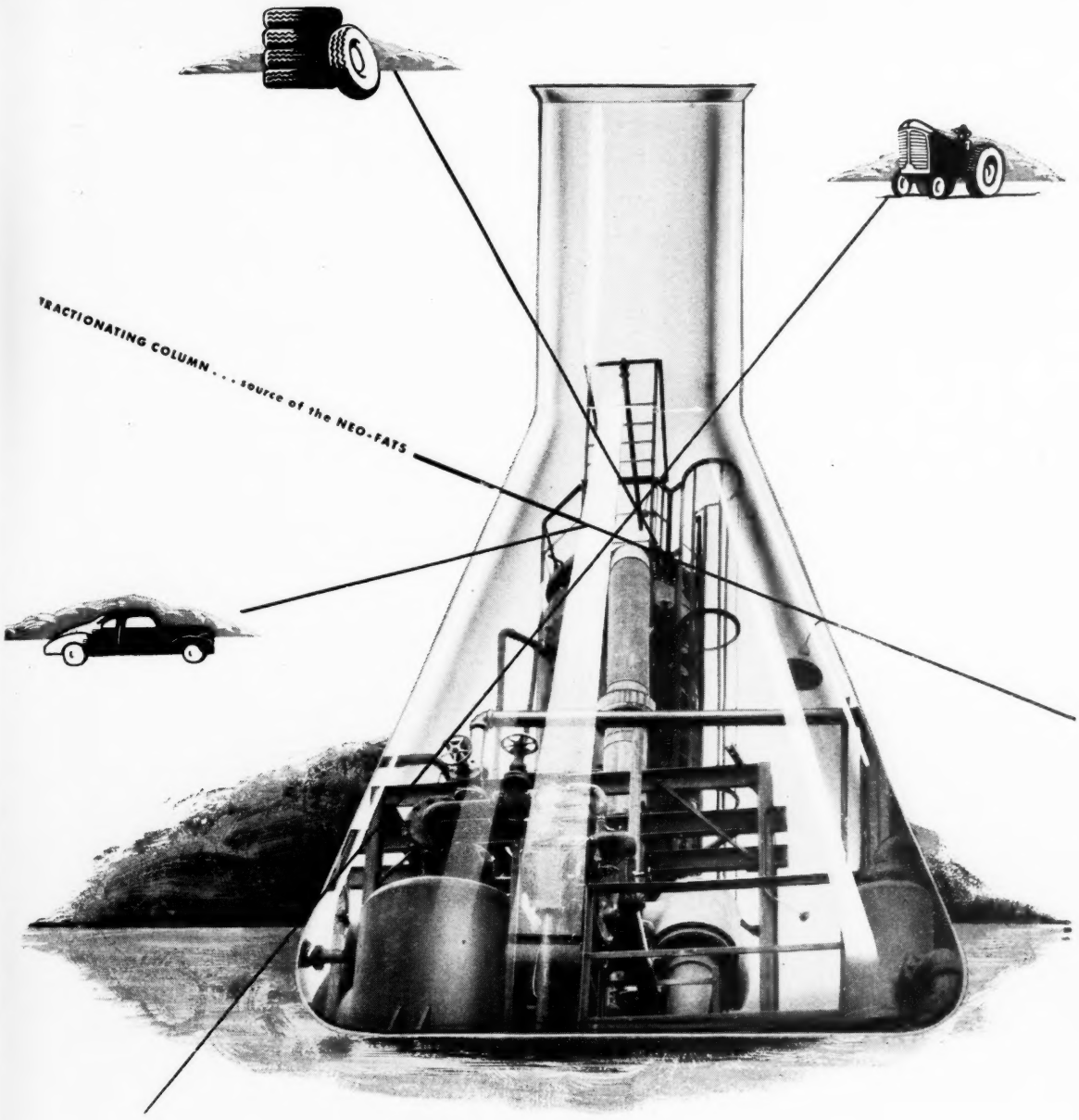

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Neo-Fats are fractionally distilled fatty acids.

Completely uniform, they can be depended upon for highest quality at reasonable cost. In the rubber industry Neo-Fats are being widely used as activating, softening and dispersing agents with excellent results.

If you have not yet discovered the advantages of the different Neo-Fats for your compounding, we suggest that you write today for full particulars.

And remember, whatever composition of pure fatty acids you may need, a Neo-Fat can be formulated to your specifications.

May we send you details on the entire series?

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ARMOUR AND COMPANY

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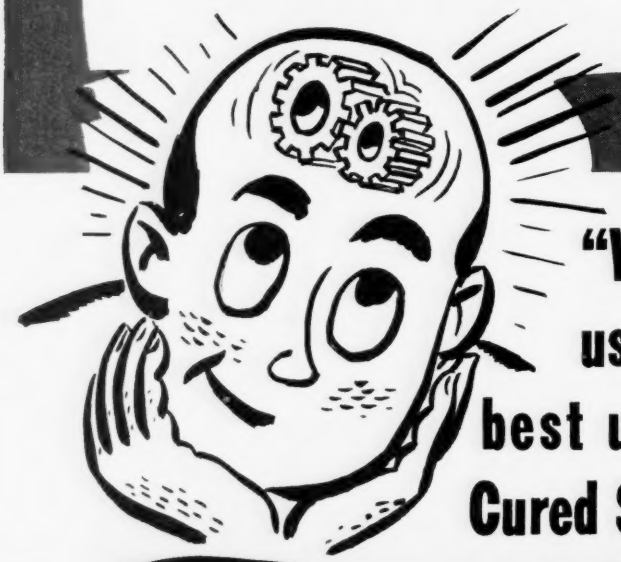

"We Invite You to help us find out how to best utilize or process Cured Synthetic Rubber Scrap"

$1000.00 IN CASH PRIZES

FACTS ABOUT THIS BIG CONTEST

A group of rubber technologists identified with the rubber industry, known as the Chicago Rubber Group, is offering three prizes, totaling $1000.00 for the best papers on the utilization (reclaiming and processing) of cured synthetic rubber scrap. While the papers may deal with any phase of the problem, here are some subjects which suggest themselves: 1. Separation and segregation of synthetic scrap rubber. 2. Methods of identification of synthetic scrap rubber. 3. Reclaiming of synthetic scrap rubber. 4. Compounding studies which will result in greater use of reclaimed synthetic scrap, or of ground synthetic scrap rubber. First prize: $500.00; second prize: $300.00; third prize: $200.00. If you feel that you have ideas of value for this contest, be sure to enter! You may win one of these substantial cash prizes.

READ THESE SIMPLE CONTEST RULES:

This contest is open to anyone in the United States or Canada, excepting officers and directors of the Chicago Rubber Group for 1943-45. Selection of subject matter is left to the discretion of the contestant. As many papers as desired may be submitted by any one contestant. Papers should be based upon information which has not previously been presented before any technical society meeting or published in any trade magazine. Contest closes at midnight on August 1, 1945. Awards will be made during the fall meeting of the American Chemical Society in Chicago, 1945. The decision of the judges will be final. Each author must submit three copies of his paper to Mr. A. R. Floreen, Vice-President, City National Bank & Trust Company, 208 S. La Salle St., Chicago. These three copies will be judged separately by the Rubber Manufacturers Association, the Rubber Reclaimers Association and the Rubber Division of the American Chemical Society. The judges will report their findings to Bruce W. Hubbard, Chairman, Chicago Rubber Group, 2512 W. 24th Street, Chicago, to whom all inquiries for additional information should be addressed.

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MODULEX

HIGH MODULUS FURNACE BLACK (HMF)

The high modulus type of furnace black has proven its distinctive value in a variety of GR-S products. It combines ease of processing with good wearing properties and low heat generation.

MODULEX, the HUBER HMF Black, is a worthy companion to WYEX, the leading channel black of today.

• ***PELLETIZED — Dustless!***

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June, 1945

Volume 112 Number 3

A Bill Brothers Publication

INDIA
RUBBER WORLD
NATURAL & SYNTHETIC

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Economic Factors in Reclaiming Synthetic Rubbers[1]

John S. Plumb[2]

THE economics of reclaiming synthetic rubbers are so closely interrelated with the technical considerations that the two factors must be considered simultaneously. In discussing the problem from the reclaimer's viewpoint, it is advisable to break the whole subject down into three main considerations: first, the economic considerations involved in the collection, distribution, and grading of scrap; second, the factors involved in the actual processing and production of the reclaimed material; and, third, the market possibilities and limitations for the finished product.

Considerations in Collection, Distribution, and Grading

The transition from natural scrap to synthetic presents this problem to the reclaimer, the consumer of reclaim, and the dealer in scrap: When will the transition commence; will it be gradual or sudden, and will it be complete? The amount of rubber scrap now on hand, that is, known inventories, will probably carry the reclaiming industry at a capacity production rate for some nine to ten months. The unknown inventory is the factor which makes any calculation of the probable exhaustion point an impossibility. There is a substantial inventory of tire parts as well as tires in the hands of manipulators, but even an approximate tonnage figure is not available. Added to this is the inventory of tire and tube scrap now running on the 20 million cars and trucks still in road service. The bulk of this is undoubtedly rubber although there have been thousands of rubber casings retreaded with GR-S. The rate at which these tires will find their way into the scrap market is another unknown and uncontrollable factor in the scrap supply. At a rough guess, taking into account these unknowns, the reclaiming industry should have at least two years of rubber scrap with which to work. By the end of this period the synthetic tires now in service will be appearing in increasingly large amounts on the scrap piles. The industry must plan, therefore, on either a gradual transition, starting within the next 12 months, or an abrupt switch to all-synthetic reclaims at the end of two years. While an abrupt change could probably be made, the technical difficulties for all concerned, producers and consumers, would certainly disrupt the industry seriously, and it is highly advisable for the reclaiming industry to work into synthetic production gradually, educating itself as well as the rubber goods manufacturers in the use of these new types of reclaim. Certainly there will be no new supply of natural rubber scrap available for several years. In normal times three years from manufacture to scrap is about the average length of time lag so that even if crude rubber becomes available in the next year, it will be well beyond the exhaustion point of our present scrap inventory before fresh natural rubber scrap appears. Therefore we face a period of indeterminate length wherein the only scrap available will be synthetic.

Naturally the synthetic scrap must and will be reclaimed. Methods have already been developed, and improvements will be made as the processors and users become more familiar with the material. It is inconceivable that scrap tires will be destroyed; the economic value is far too great, and the value of the reclaimed material is too important to the manufacturing industry to permit any such waste.

What, then, confronts the reclaimer as the first problem? The collection and distribution of scrap are well organized, and we may safely assume that the change from natural to synthetic will have no bearing on the mechanics of this operation. The necessity of sorting and grading, on the other hand, becomes of first importance, and in this field the collectors and distributers of scrap are as inexperienced as the rest of the rubber industry when synthetic is substituted for crude. It has been learned by the reclaimers that crude rubber and most of the synthetics, particularly Buna S and neoprene, are not responsive to the same plasticizing treatment. Therefore the first requirement of good sorting is the positive separation of synthetics of various types both from one another and from rubber. In the case of factory scrap, such as overflow, seconds, trimmings, etc., this separation should be relatively simple. It is equally important to the consumer of reclaim because the quality of the reclaim will be affected seriously by contamination of one rubber by another. A program of institutional advertising will be necessary to acquaint the manufacturers of rubber goods with the necessity of main-

[1] Presented before the meeting of the New York Rubber Group, Apr. 13, 1945, at the Building Trades Club, New York, N. Y.
[2] Vice president, U. S. Rubber Reclaiming Co., Buffalo, N. Y.

taining high standards of scrap sorting in their own operations, and fortunately the scrap dealers have already begun a systematic campaign for this purpose.

Assuming that factory scrap can be ultimately well sorted and packed, with very little, if any, additional cost, we must consider next the sorting of used rubber goods scrap. Tires constitute somewhere around 70% of the reclaiming industry's raw material, and a negligible amount of the tonnage is developed by the manufacturers. The greatest bulk of raw material for reclaiming, therefore, comes directly to the scrap dealer from the highway. Before the introduction of synthetic there was, of course, no problem in sorting tires. They were either passenger or truck, and a reclaim made from either would have a chemical analysis and physical properties within remarkably close limits from lot to lot. Consequently there has never been a cause for careful sorting of tires except as to size or condition. Now, however, the reclaimer must know whether his raw material is rubber, synthetic, a mixture of both in the compound, or a synthetic portion bonded to a rubber portion. This situation entails a much more careful grading than ever before; in fact it now involves an inspection of each individual tire, an operation which obviously increases the cost of handling scrap, no matter who does the sorting, collector, dealer, shipper, or reclaimer. This additional cost must be reflected eventually in the cost of the finished reclaim. How much this increased cost may amount to will depend on the fidelity of the tire builders in adhering to the practice of marking tires by means of mold marks and the red spot prescribed by the WPB. Without these identifying marks the reclaimers will be absolutely unable to sort tires with any degree of accuracy, and the quality of the finished product will deteriorate seriously. Here again there is a possibility that different types of synthetic tires will command different prices owing to the desirability of one type over another. At present no such differentials have developed.

When tire parts are considered, the sorting and identifying becomes even more difficult. Once the tire has been split for the purpose of cutting patches, reliners, etc., the distinguishing marks are lost except on the outer pieces, and in most cases even then cannot be found. The reclaimers will have to rely on their sources of supply for conscientious sorting of this type of scrap if the processing is to be kept free of troublesome complications. Methods have been developed for the positive determination of the various kinds of rubbers in mixtures, but the application of these chemical tests becomes an impractical procedure in handling large amounts of scrap. Essentially, the tires must be easily identifiable before they are cut, and the manipulators must at all costs segregate the different types after cutting. Otherwise the reclaimers will have lost all control over the processing and ultimate properties of the finished reclaims.

It can be seen, then, that increased costs of scrap may result if proper sorting is not observed by the producers of factory scrap, tire parts, and other miscellaneous items which are too small to be marked at the time of manufacture. Tires can be sorted properly by the collectors or reclaimers as long as the manufacturers continue the use of the identifying marks, although some additional labor cost is involved in the sorting.

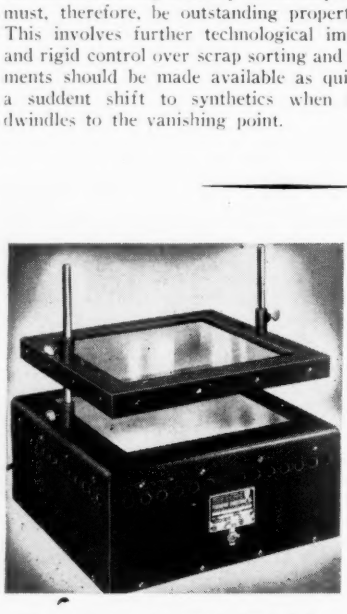
Processing Synthetic Scrap

The greatest increase in cost of producing reclaim from synthetic scraps is probably to be expected in the actual processing, rather than in the collection and sorting of scrap. From the work that has been done and from information published, patent applications and other sources, it is apparent that the standard reclaiming equipment can probably be used without too much modification. To be sure, variations in temperature and time cycles will be required, but, in general, no great equipment changes will be necessary, at least for the GR-S now available as scrap. Further improvements in the GR-S may, of course, render present reclaiming facilities obsolete, but for the present such an eventuality does not seem likely. It can be fairly safely stated, therefore, that no great expense will be entailed in plant and equipment modification.

Extension of time cycles would, of course, involve an increase in equipment to maintain capacity, but this also at present is unlikely. Where the chief additional expense is to be expected is in the reagents used. Common reclaiming oils and solvents used on rubber, such as pine tar, coal tar, naphtha and the like, are not too effective on GR-S. Such complex organic materials as dihydroxyaryl sulphides, mercaptans, and hydrazines have been found to be particularly effective, but the cost of these reagents is high; and although they are used in relatively small percentages, the total materials cost in a GR-S reclaim is considerably higher than in the case of rubber. The production rates, that is the machine hour rates on GR-S reclaims, particularly as regards refining, will probably be lower than the rates on rubber. This situation may be temporary, applicable only until the reclaimers become more accustomed to handling the new reclaims, but it seems reasonable to expect that more care will have to be exercised in regulating refiner temperatures, size of batch, etc., which will tend to reduce the production rate and, consequently, increase the cost.

Market Possibilities

The demand for synthetic reclaims has so far been small and spasmodic, depending largely on conditions occasioned by war restriction orders. From time to time one or another of the various synthetic programs has fallen behind consumption, and in isolated cases the synthetic reclaim has been used to extend the supply of the crude material. This point has applied especially to neoprene, but not in large amounts. The supply of suitable well-sorted scrap has been another deterrent in building up a market for synthetic reclaims. The manufacturer of articles requiring the special properties of neoprene, for example, will not be able to use a neoprene reclaim which is contaminated with rubber or other materials which deteriorate the properties of the neoprene. Even where the contamination feature is relatively unimportant, the user of reclaim is not inclined to pay more for synthetic reclaim if he is still able to use rubber reclaim. In tire compounding rubber reclaims can and are being used in conjunction with GR-S, and as long as rubber scrap is available, the tire manufacturer will not have any demand for a higher priced GR-S reclaim. It is too early to prognosticate whether it will be possible to manufacture synthetic reclaims for approximately the same prices as rubber, and if it is not possible, while rubber scrap is still available, it will be difficult to establish experience in manufacture and use of synthetic reclaim. Outside of special applications, oil resistance, color, or in cases where rubber is incompatible with synthetic, the market for synthetic reclaims at present is very small. The only incentive for the rubber manufacturing industry to develop uses for synthetic reclaims must, therefore, be outstanding properties at comparable prices. This involves further technological improvements in reclaiming and rigid control over scrap sorting and collection. These developments should be made available as quickly as possible to avoid a sudden shift to synthetics when the rubber scrap supply dwindles to the vanishing point.



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Rosin and Terpene Chemicals In GR-S Tire Tread Compounds

Lyle O. Amberg[1] and John H. Elliott[1]

THIS evaluation of rosin and terpene chemicals in GR-S tire tread compounds was begun in the early part of 1943. At that time the rubber industry was particularly interested in a material which would give building tack and improved processing properties to GR-S. The industry was successful in developing usable methods of processing GR-S and techniques which overcame, to some extent, difficulties arising from the lack in GR-S of building tack. With progress being made in this direction, attention was focused upon resistance to cut-growth on flexing and heat build-up. Any improvement which could be effected in these two properties would be reflected in a corresponding improvement in GR-S treads.

Therefore at the present time it is believed that a satisfactory accessory material should confer upon the GR-S vulcanizate low hysteresis (heat build-up properties) and good resistance to heat embrittlement on aging, particularly in regard to growth of cuts on flexing, provided, of course, that the added material is otherwise usable. Our interpretation of the experimental data has been made in light of these two important characteristics. Conclusions on the hysteresis properties were postulated on the basis of data obtained for the 300% modulus, resilience, hardness, and boardiness. Unreported data on heat build-up values (Goodrich flexometer) for a few test cases confirmed the validity of this method of characterizing hysteresis properties. Heat embrittlement was studied through measurement of hot flex cut-growth after aging.

Processing properties of the GR-S compounds and physical constants of the vulcanizates are given in tabular form (Tables 2 and 3), and properties that are outstandingly good or poor are discussed.

Experimental

The test tire tread stocks were compounded on a water-cooled, six- by 12-inch, two-roll mill using the formulae given in Table 1. The times required to add (a) the softener and (b) the carbon black were noted carefully during the milling operations.

TABLE 1. BASIC COMPOUNDING FORMULAS
Tire Tread Test Compositions

	GR-S (Parts by Weight)	Natural Rubber (Parts by Weight)
GR-S*	100.	..
Smoked sheets	..	100.
Channel black (Micronex Beads)	50.	50.
Zinc Oxide XXR-4	5.	5.
Stearic Acid (Stearex Beads)	1.0	3.25
Pine Tar	..	2.
N-Cyclohexyl-2-benzothiazole sulphenamide (Santocure)	1.8	0.66
Sulphur, Micronized	2.	2.5
"Softener"	10.	..

* Equal parts material from each of three Rubber Reserve plants.

After the stock had been compounded, observations and determinations were made as follows. The building tack was estimated in a qualitative way by pressing a portion of the stock on to itself, and then pulling the two layers apart. Plasticity data were determined on the unvulcanized stock at 212° F., using the Goodrich plastometer.[2] Plasticity ("P") calculated from 30-second yield and recovery values and softness ("S") calculated from 30-second yield values (Tables 2 and 3) were obtained when measured as described by Karrer, et al.[2] Owing to the loggy nature of GR-S tire tread stocks, however, a 90-second recovery value was found to give a better measure of retentivity. The retentivity ("R") reported in Tables 2 and 3 is, therefore, calculated from this 90-second recovery value. Hence the product of "S" and "R," as recorded, does not equal "P," which would be the case for 30-second "S" and "R" values by definition.[3]

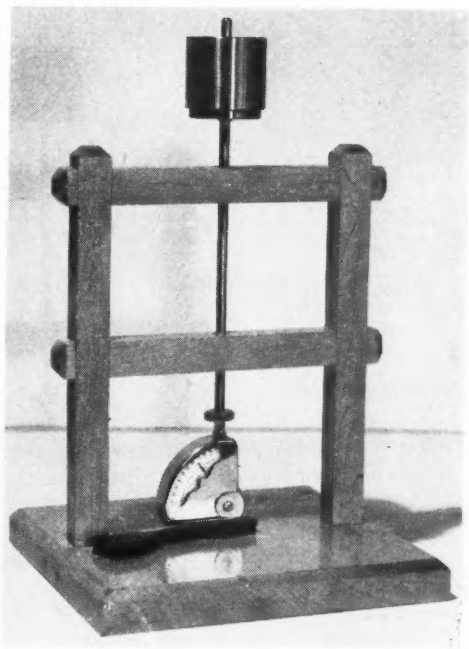


Fig. 1. Shore Durometer and Stand

The compounded stocks were vulcanized at 280° F. for various lengths of time according to the procedure given in A.S.T.M. Designation D-15-41,[3] and tensile and tear data were run on specimens cut with A.S.T.M. die, type "C" (D-412-41), and A.S.T.M. die, type "A" (D-624-41-T), respectively. Bench marks one inch apart were made on the tensile specimens, and the elongation and 300% modulus were determined concurrently with tensile strength. Shore hardness was determined according to A.S.T.M. Method D-676-42-T, using a special device (Figure 1) to apply a two-pound load to the durometer. Hardness and Bashore rebound resilience were determined at 77° F. on samples conditioned overnight at that temperature.

Optimum cure time was determined by averaging graphically the values obtained for the times required for the modulus, elongation, hardness, and resilience curves to level off, and for tensile strength and tear strength to reach a maximum, with special emphasis being given to the values determining the modulus curve. A typical set of curves is given in Figure 2, and a line for the optimum cure time value is shown for this set of curves. The authors believe that this method of determining optimum cure time gives data which more nearly approach those representing a composition of practicable cure than is the case when a single property, such as tear or tensile strength, is considered.

The rate of flex cut-growth of these tire tread stocks was determined at 180° F., on prenicked specimens prepared for bend flexing, on a De Mattia-type flexing machine (A.S.T.M. D-430-40). This machine is adjusted to flex the molded samples at 315 cycles per minute and has a stroke of one inch, which bends the specimens through an angle of approximately 90 degrees. It was found desirable to have the groove parallel to the mill grain of

[1] Hercules Experiment Station, Hercules Powder Co., Wilmington 99, Dela.
[2] E. Karrer, J. M. Davies, and E. O. Dietrich, *Ind. Eng. Chem., (Anal. Ed.)*, 2, 96 (1930).
[3] "A.S.T.M. Standards on Rubber Products (with Related Information," American Society for Testing Materials, Philadelphia, Pa. (1944).

TABLE 2. ROSINS AND THEIR DERIVATIVES IN A GR-S TIRE TREAD STOCK

Hercules Powder Company

GR-S Compound Number	Materials Tested As "Softeners"	Building Tack	Minutes to Add Softener	Minutes to Add Black	Dispersion of Softener	Processing Properties: "S", "R", "P" Goodrich (212°F.)	"S", "R", "P" Goodrich (90 sec. (212°F.)	"S", "R", "P" Goodrich (212°F.)	Minutes to Optimum Cure at 280°F.	Physical Properties of Vulcanizate: Modulus 300% Modulus at Optimum p.s.i.	Modulus 300% Modulus at 100% Overcure, p.s.i.	Flex Cut Growth Hot (180°F.) Flex Cut-Growth Unaged 24 Hrs. at 212°F. Inches per 100,000 Flexes (a)	Hot (180°F.) Flex Cut-Growth Aged 24 Hrs. at 212°F. Inches per 100,000 Flexes (a)	Tensile Strength at Optimum p.s.i.	Elongation 15 Min. at 280°F., %	30 Min. at 280°F., %	60 Min. at 280°F., %	90 Min. at 280°F., %	120 Min. at 280°F., %	150 Min. at 280°F., %	Tear Strength at Optimum lb./in.	Shore Hardness at Optimum (77°F.)	Resilience Rebound at Optimum (77°F.)
	GR-S Stock, No Softener	B	-	10	-	0.245	0.275	0.082	60	2000	2250	18	250	2615	845	445	365	330	340	340	275	61	34
	Natural Rubber, No Softener	N	-	10	OK	0.558	0.810	0.419	50	1950	2000	0.6	6.0	4400	670	610	520	500	-	-	950	59	36
1	Poly-pale® Resin - Linseed Oil Varnish Base (Resin:Oil Ratio 1:1)	P	3	6.5	OK	0.226	0.354	0.141	75	1650	1810	15	29	2900	-	600	500	400	390	380	300	66	30
2	Rosin Oil, Distilled	P	5	6	OK	0.439	0.383	0.204	60	1565	1840	22	-	2605	-	610	415	390	375	370	280	61	36
3	Pentalyn® M (Phenolic-Modified Pentaerythritol Ester of Rosin)	P	2.5	8	OK?	0.310	0.313	0.122	90	1500	1900	20	-	1865	-	460	385	330	330	320	265	65	32
4	Dehydrogenated Rosin, Triethylene Glycol Ester	F	2.5	3.5	OK	0.426	0.327	0.179	75	1500	1720	17	-	2750	-	600	445	460	415	400	280	57	32
5	Dehydrogenated Rosin, Glycerol Ester	F	1.5	3	OK	0.401	0.318	0.161	75	1500	1630	18	-	2600	-	590	460	420	430	405	290	57	35
6	Dehydrogenated Rosin, Methyl Ester	P+	2	4	OK	0.429	0.314	0.175	75	1500	1600	18	-	2600	-	590	460	420	430	405	290	57	35
7	Vinsol® Resin - Linseed Oil Varnish Base (Resin:Oil Ratio 1:3)	P+	3	5	OK	0.241	0.333	0.162	90	1475	1575	-	32	2740	-	550	430	480	415	350	285	70	30
8	Hydroabietyl Alcohol	F-	4	5	OK	0.460	0.548	0.288	75	1460	1500	19	160	2400	-	660	470	400	415	400	290	51	33
9	Petrex®, (Terpene - Maleic Anhydride Condensate) Hydrogenated Dibutyl Ester	P	4	6	OK	0.421	0.372	0.198	75	1420	1525	23	-	2300	-	525	410	365	395	390	285	56	37
10	Hydroabietyl Alcohol, Acetic Acid Ester	F-	4	8	OK	0.440	0.401	0.216	75	1405	1500	23	-	2550	-	675	470	390	420	405	295	53	34
11	Dehydrogenated Rosin, Ethylene Glycol Ester	F	3	3	OK	0.411	0.321	0.164	75	1400	1480	21	-	3000	-	670	535	445	430	445	325	57	32
12	Staybelite® Resin (Hydrogenated Rosin)	F	1.25	6.5	OK	0.428	0.377	0.252	105	1375	1600	11	36	2900	-	905	630	520	480	450	300	56	27
13	Hydroabietyl Alcohol, Ricinoleic Acid Ester	P+	3.5	8.5	OK	0.467	0.544	0.254	105	1350	1400	39	-	2600	-	640	500	440	440	430	280	51	32
14	Galex Rosin (Rational Rosin Oil and Size)	F-	1.5	5.5	OK	0.355	0.327	0.140	120	1325	1600	18	22	2740	-	780	560	520	490	430	315	60	28
15	Abalyn® (Methyl Ester of Rosin) Sulfurized	P-	5	8.5	OK	0.405	0.297	0.165	75	1325	1460	22	-	2750	-	560	480	480	480	495	265	56	35
16	Hydroabietyl Alcohol, Glycolic Acid Ester	F-	2	5	OK	0.438	0.348	0.190	75	1310	1525	22	-	2400	-	630	450	440	445	440	280	55	33
17	Neolyn 41 (Modified Alkyd Resin)	M	1.5	10	OK	0.212	0.353	0.094	60	1310	1420	14	-	2300	-	550	425	405	395	390	300	70	30
18	Dehydrogenated Rosin, Pentaerythritol Ester	F-	1.5	3.5	OK	0.443	0.387	0.213	75	1300	1530	14	-	2650	-	710	500	470	475	440	300	59	33
19	Wood Rosin, Cyclohexanol Ester	P++	2	4.5	OK	0.403	0.297	0.204	90	1300	1500	18	-	3160	-	695	570	525	525	510	295	55	34
20	Dehydrogenated Rosin	F	1.75	6.5	OK	0.434	0.309	0.177	120	1300	1500	20	38	2795	-	905	650	525	470	420	300	57	27
21	Bardol (The Barrett Div., Allied Chemical and Dye Corp.)	P	2	9	OK	0.476	0.609	0.325	50	1300	1400	18	57	2850	-	490	380	400	380	-	270	60	36
22	Neolyn® 40 (Modified Alkyd Resin)	F-	3	10	OK	0.360	0.443	0.200	90	1300	1350	16	-	2300	-	670	490	420	410	430	325	65	30
23	Dehydrogenated Rosin, Diethylene Glycol Ester	F	3	3.5	OK	0.468	0.426	0.245	75	1275	1500	22	-	2700	-	685	495	485	465	430	285	56	33
24	Pentalyn® G (Pentaerythritol Ester of Rosin)	M	5	8	SI	0.457	0.645	0.287	90	1220	1375	18	-	2400	-	750	530	460	470	460	330	60	29
25	Hydroabietyl Alcohol, Abietic Acid Ester	F	3	9	OK	0.433	0.480	0.275	75	1200	1325	18	37	2750	-	720	585	495	485	475	315	52	31
26	BRT No. 7 (The Barrett Div., Allied Chemical and Dye Corp.)	P	3.5	4.5	OK	0.404	0.678	0.294	60	1150	1300	16	59	2920	-	570	525	475	565	480	285	59	32
27	Vinsol® Ester No. 2 (Diethylene Glycol Ester)	P-	2	8	SI	0.272	0.452	0.146	90	1130	1300	15	-	2150	-	490	470	405	435	430	255	67	33
28	Staybelite® (Hydrogenated Rosin) Ester No. 10 (Glycerol Ester)	F-	2	9	OK	0.324	0.504	0.260	75	1125	1290	13	-	2475	-	640	510	475	435	445	335	58	33
29	Vinsol® Resin (13%), Dehydrogenated Rosin (87%) (Fused Blend)	P+	3	6	OK	0.348	0.427	0.182	105	1100	1425	12.5	23	3150	-	985	710	620	565	485	360	57	30
30	Paving Asphalt, Stanolind No. 6 (Standard Oil Co.)	P	4	5	OK	0.517	0.607	0.343	95	1100	1200	17	45	2250	-	780	510	470	450	420	300	54	30
31	Paraflux (C. P. Hall)	P-	3	5.5	OK	0.386	0.577	0.252	60	1100	1200	18	33	2880	-	635	565	550	520	-	270	54	32
32	Naftolen R-100 (Wilmington Chemical Corp.)	P-	1	10	OK	0.352	0.708	0.410	60	1100	1200	30	66	2670	-	670	540	525	505	460	280	56	31
33	Flexalyn® (Diethylene Glycol Ester of Rosin)	P++	4	9	OK	0.424	0.520	0.302	75	1060	1140	20	-	2450	-	635	520	495	510	480	325	57	33
34	Wood Rosin, Pale (50%), Bardol (50%) (Added Separately)	P+	3	5	OK	0.392	0.509	0.222	75	1060	1075	-	-	2700	-	700	530	510	490	-	325	58	30
35	Abalyn® (Methyl Ester of Rosin)	P	4	9	OK	0.422	0.374	0.205	75	1050	1190	21	-	2600	-	630	520	505	485	515	300	56	33
36	Wood Rosin, Pale (80%), Solvenol No. 1 (20%) (Fused Blend)	F-	4	6	OK	0.428	0.400	0.236	120	1050	1075	10	18	3200	-	920	690	645	595	610	385	59	27
37	Wood Rosin, Triethanolamine Ester	F	1	6	OK	0.527	0.721	0.388	75	1020	1030	17	-	3200	-	710	645	610	595	605	330	56	28
38	Wood Rosin, Pale	P++	1.5	6	OK	0.449	0.415	0.246	105	1000	1125	17	33	3300	-	840	695	600	595	575	350	56	27
39	Abietic Acid, Commercial	P+	1.5	6.5	OK	0.436	0.575	0.296	105	1000	1075	18	-	3450	-	950	660	650	640	640	350	56	29
40	Poly-pale® Resin (Polymerized Rosin)	P+	1.5	6.5	OK	0.463	0.610	0.282	120	1000	1050	15	22	3300	-	845	725	635	615	555	400	58	26
41	Dehydrogenated Rosin (75%), Belro Resin (25%) (Fused Blend)	F	3	7	OK	0.486	0.681	0.331	105	960	1225	14	18	3325	-	990	775	760	660	615	465	55	29
42	Dehydrogenated Rosin (75%), Vinsol Resin (25%) (Fused Blend)	F	2	8	OK	0.477	0.750	0.450	120	925	1375	16	24	3420	-	1010	810	710	690	645	485	59	29
43	Turgum (J. M. Huber)	P++	2.5	7	OK	0.452	0.639	0.315	75	900	900	8	17	3375	-	910	730	660	640	650	370	58	29
44	Pine Tar, Heavy (E. W. Colledge)	P	1.5	5	OK	0.423	0.554	0.264	90	875	950	-	-	3020	1025	750	695	610	600	-	340	56	32
45	Vinsol® Resin	P+	3	6	OK	0.033	0.539	0.016	120	850	1150	6	10	3080	-	1000	780	735	770	680	420	70	25
46	Gum Rosin, Pale	P+	1.5	6	OK	0.392	0.487	0.224	90	830	925	7.5	21	3390	-	-	770	710	680	665	420	59	27
47	Melhi® Resin	P	1.5	4.5	OK	0.400	0.653	0.286	90	800	925	8	19	3080	-	990	765	715	680	675	495	61	28
48	Turgum S (J. M. Huber)	P++	2	7	OK	0.447	0.635	0.315	75	800	800	9	21	3400	-	860	745	720	670	705	390	58	28
49	Vinsol® Resin, Hydrogenated	M	2.5	5	S	0.103	0.463	0.066	90	790	950	-	13	3170	-	1050	805	750	750	-	415	67	26
50	Belro® Resin	P-	2	9.5	OK	0.361	0.588	0.244	120	750	750	6	15	3310	-	950	790	735	735	695	415	64	24
51	Vinsol® Resin, Dehydrogenated	M	2.5	5	S	0.158	0.542	0.098	90	740	900	-	15	3250	-	1090	840	780	735	-	450	65	29
52	Wood Rosin, FF	P+	1.5	6	OK	0.493	0.896	0.356	90	700	825	9.5	20	3320	-	1065	770	720	720	690	440	53	28

Notes to Table 2

N = None
B = Bad
P = Poor
F = Fair
G = Good
E = Excellent
OK = Satisfactory dispersion on cool rolls
S = Added as solution in volatile solvent, dispersion satisfactory
SI = Slightly incompatible on cool mill

(a) Inches growth of nick in specimen per 100,000 flexes in De Mattia-type flexing machine operating at 315 one-inch strokes per minute, bending three inches of specimen. Values reported are average of three cures: the optimum, 70% of the optimum, and 150% of the optimum.

* Registered U. S. Pat. Off. by Hercules Powder Co.

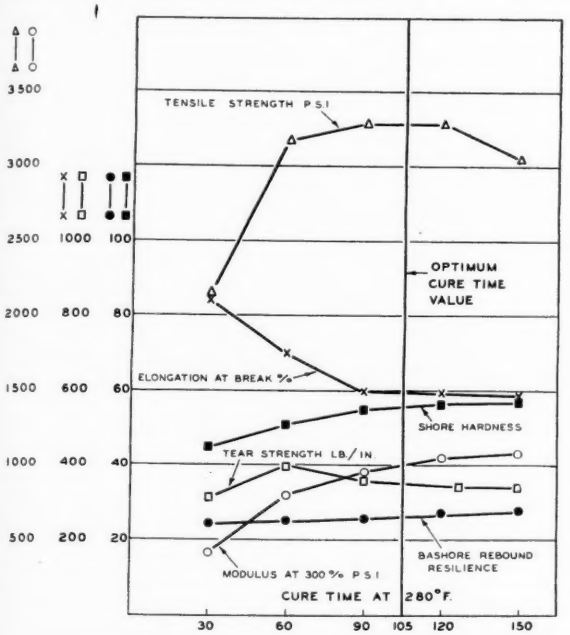


Fig. 2. Typical Curves of Test Values with Optimum Cure Indicated

the stock so that the cut would grow along the groove in the direction of the grain. Specimens cured for three different time intervals were tested; these were the optimum, 70% of the optimum, and 150% of the optimum cure time.

When hot flex cut-growth values on aged samples were desired, the specimens were aged for 24 hours at 212° F. in a Geer-type air oven (A.S.T.M. D-573-42).

Heat build-up was determined on a few samples, using the Goodrich flexometer, described by E. T. Lessig,[1] and the procedure given in A.S.T.M. Method D-623-41-T.

Discussion of Results

Table 2 gives the results obtained when 10 parts of the various rosin-derived products listed were incorporated, as the softener, into the GR-S tire tread formula given in Table 1. In the interest of easier interpretation of test data the materials are listed in descending order of the modulus of the GR-S compound at optimum cure.

A number of unreported tests indicate that when the GR-S compound (Table 1), containing 10 parts of any one of the rosin chemicals tested, shows a 300% modulus of 1,400 p.s.i., when fully cured, and a Shore "A" hardness of approximately 56, it will have good heat build-up characteristics. Any significant variation from either of these values will result in less desirable heat build-up characteristics. The data for the compound (No. 12) with Staybelite[2] resin showed a modulus of 1,375 p.s.i. and a Shore hardness of 56. In an actual determination of heat build-up (Goodrich flexometer), this Staybelite resin-containing compound gave slightly better results than either unsoftened or coal tar-softened compositions. It was comparable to a similar natural rubber compound (composition given in Table 1). Furthermore the Staybelite resin-containing compound gave the best all-round results of all the materials listed in Table 2. For these reasons Staybelite resin is used as a comparison for the other materials.

[1] *Ind. Eng. Chem., (Anal. Ed.)*, 9, 583 (1937).
[2] Reg. U. S. Pat. Off. by Hercules Powder Co.

TABLE 2. LIQUID TERPENES AND DERIVATIVES IN A GR-S TIRE TREAD STOCK

Number	Materials Tested As "Softeners"	Building Tack	Processing Properties: Minutes to Add Softener	Minutes to Add Black	Dispersion of Softener	"Scorch" Goodrich (212°F.)	"Scorch" Goodrich (90 sec.) (212°F.)	"Scorch" Goodrich (212°F.)	Physical Properties of Vulcanizate: Tire Cut Growth: Optimum Cure Time at 280°F.	300% Modulus at Optimum Cure p.s.i.	300% Modulus at 100% Over-cure p.s.i.	Hot (180°F.) Flex Out-growth Aged Inches per 100,000 Flexes (a)	Hot (180°F.) Flex Out-growth Unaged Inches per 100,000 Flexes (a)	Hot (180°F.) Flex 24 Hrs. at 212°F. in Geer Oven Inches per 100,000 Flexes (a)	Tensile Strength at Optimum p.s.i.	Elongation 280°F. 15 Min. %	Elongation 280°F. 30 Min. %	Elongation 280°F. 60 Min. %	Elongation 280°F. 90 Min. %	Elongation 280°F. 120 Min. %	Elongation 280°F. 150 Min. %	Tear Strength at Optimum lb./in.	Shore Hardness at Optimum (77°F.)	Bashore Rebound at Optimum (77°F.)
	GR-S Stock, No Softener	B	-	-	-	-	-	-	250	2000	2200	18	0.6	6.0	2615*	845	1365	1330	1340	1345	1345	275	59	36
	Natural Rubber, No Softener	M	-	10	OK	0.558	0.610	0.419	50	1950	2000	-	-	-	4100	670	520	500	485	435	435	950	62	36
1	Terpin Hydrate	N	1	6		(b)	0.425	0.389	0.210	60	1800	1825	-	-	1830	-	335	315	305	300	300	280	69	29
2	Beta-Pinene, Polymerized	G	2	8	OK	0.416	0.476	0.202	75	1700	1700	18	-	68	2960	-	620	490	455	425	400	300	59	31
3	Para-Cymene	P	3.5	5.5	OK	0.418	0.342	0.173	60	1600	1650	19	-	44	2990	-	570	450	455	395	375	270	58	37
4	Dipentene 122	P	3.5	4	OK	0.351	0.365	0.455	90	1500	1500	15	-	54	2960	-	585	510	475	480	410	310	56	35
5	alpha-Terpineol	P	2.5	9	OK	0.368	0.335	0.115	75	1475	1500	55	-	-	2300	-	450	400	370	380	300	300	58	36
6	Wood Turpentine, Steam Distilled	B	3	10.5	OK	0.386	0.314	0.146	60	1400	1575	17	-	37	2940	-	600	615	460	460	415	405	365	56	36
7	Terpasol* No. 5 (Terpinyl Glycol Ether)	P	4	8	OK	0.405	0.345	0.175	60	1360	1400	22	-	44	2900	-	560	495	440	400	400	365	57	36
8	Pine Oil, Yarmor* 302	P	4	9.5	OK	0.371	0.215	0.291	90	1350	1400	17	-	40	2460	-	550	530	450	410	390	280	54	34
9	Terpasol* No. 3 (Terpinyl Methyl Ether)	P	2	7	OK	0.380	0.295	0.115	90	1225	1280	12	-	40	2960	-	560	560	480	470	460	315	55	35
10	alpha-Terpinene	P	4.5	7	OK	0.422	0.417	0.213	90	1120	1100	9	-	19	3020	-	715	690	680	645	675	325	52	34
11	Hercosol* No. 60 (Mixture of Terpene Hydrocarbons and Ketones)	P	3	4.5	OK	0.388	0.535	0.239	90	1100	1000	12	-	33	3340	-	685	600	620	625	655	275	51	34
12	Terpinolene	P	2.5	6	OK	0.360	0.375	0.169	60	800	800	4	-	17	2990	-	710	755	705	745	745	425	46	31
13	Solvenol* No. 1 (Monocyclic Terpene Hydrocarbons)	B	2.5	7.5	OK	0.417	0.353	0.181	60	790	1020	7	-	30	3000	-	755	700	630	625	670	360	50	34

N = None OK = Satisfactory dispersion on cool rolls
B = Bad SI = Slightly incompatible on cool mill
P = Poor F = Fair G = Good E = Excellent

(a) Inches growth of nick in specimen per 100,000 flexes in De Mattia-type flexing machine operating at 315 one-inch strokes per minute, bending three inches of specimen. Values reported are average of three cures: the optimum, 70% of the optimum, and 150% of the optimum.

(b) Incompatible in uncured compound, sublimes out of cured sheet.

* Registered U. S. Pat. Off. by Hercules Powder Co.

Several general conclusions can be drawn. Almost all the products listed in Table 2 improved the rate of incorporation of carbon black in GR-S stock and showed a small but measurable improvement in building tack over either unsoftened or coal tar-softened compounds. Tensile strength and resistance to flex cut-growth were generally considerably improved by the presence of these rosin-derived products, but those with their original carboxyl content essentially unchanged (e.g., wood rosin, Staybelite resin, and dehydrogenated rosin) retarded the rate of cure of this standard stock, containing a mercaptobenzothiazole-type accelerator.

The effects of these softeners on modulus at optimum cure time were quite varied, as may be observed by inspection of the data in Table 2. Those compounds which gave a higher modulus than the GR-S compound (No. 12) containing Staybelite resin generally displayed low values in some other properties such as elongation, tear strength, or hot flex cut-growth resistance, although their heat build-up characteristics might be quite good. The effects of pale and dark wood rosins (Compound Nos. 38 and 52), commercial abietic acid (Compound No. 39), pale gum rosin (Compound No. 46), and Poly-pale[5] and Melhi[5] resins (Compound Nos. 40 and 47), on the test compound were all quite similar; in particular, they retarded the rate of cure and, compared to Staybelite resin, gave low moduli. While the hot flex cut-growth rates of their compounds, after aging, were only fair as compared to those given by Staybelite resin, the values were quite good in comparison to those given by the non-resinous softeners tested.

In addition to a retarded rate of cure, the Belro[5] resin-containing stock (Compound No. 50) had a very low modulus and was hard and boardy; however it showed exceptional aged hot flex cut-growth resistance. Vinsol[5] resin (Compound No. 45) dehydrogenated Vinsol resin (Compound No. 51), and hydrogenated Vinsol resin (Compound No. 49) were difficult to disperse on the laboratory mill, and the vulcanizates showed low moduli as compared to that containing Staybelite resin; in addition, they were exceptionally hard and boardy. The boardiness produced by Vinsol resin carried over into those compounds (No. 27) containing its diethylene glycol ester (Vinsol Ester No. 2).

Dehydrogenated rosin (Hercules Resin 732) in the GR-S compound (No. 20) gave results similar to those imparted by Staybelite resin and, hence, is one of the best overall materials in this series. Tests on blends of dehydrogenated rosin with other resinous materials indicate that the effect of a given material in a blend of this type is roughly additive.

In general, the effects on the GR-S stock of the esters derived from rosin chemicals were essentially those of the corresponding resin acid except that the retarding effect on the rate of cure was not so pronounced.

Table 3 summarizes the results for 10 parts of liquid terpenes per 100 parts GR-S in the test formula. Since the primary purpose of this work has been to find or develop materials suitable for commercial use as auxiliary components in GR-S compounding, technical-grade materials were used. Consequently no attempt has been made to correlate the chemical structure of the terpenes with their effects on the GR-S compound.

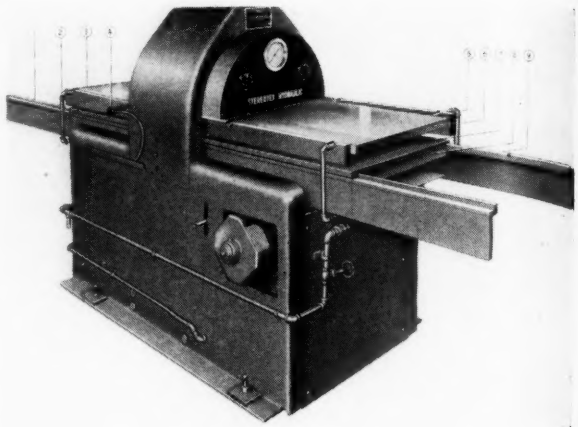
In a number of cases the terpenes gave compounds with moduli in the same range as Staybelite resin. Usually the resilience was considerably improved, but in most cases at the expense of tensile strength and hot flex cut-growth resistance after aging. However a variety of effects may be obtained with these liquid terpenes, which makes them of considerable interest when used in blends, for example, with either rosin-derived or non-resinous softeners.

Summary

This work indicates that those rosin-derived materials, whose predominantly resin acid character has not been drastically altered, should give satisfactory processing properties, improved aged hot flex cut-growth resistance, good tensile and tear strengths, and improved elongation to the GR-S tire tread formula studied. Modulus values varied over a wide range, and most of the materials tested inhibited the rate of cure of the GR-S test compound containing a mercaptobenzothiazole-type accelerator. This cure-retarding effect may be reduced, for example, by esterifying the resin acids. It appears from laboratory tests that the best of these rosin chemicals confer valuable properties to a GR-S tire tread stock, over and above their function as softeners.

The liquid terpenes, owing to their individualistic behavior in the GR-S stock, offer considerable promise for use in conjunction with resins, or possibly non-resinous softeners, since a particular terpene can be selected to modify the effect of the other auxiliary material in a desirable manner.

The writers wish to express their appreciation for the helpful advice given by R. R. Olin, rubber consultant, during the course of this work, and for the technical assistance of Charles S. Huhn and Miss Josephine Bentley, of the Hercules Experiment Station staff.



Stereotex Hydraulic Press

Preheating, Molding, and Chilling Press

AN HYDRAULIC preheating, molding, and chilling press for a rapid production of rubber printing plates and various plastic plates and molds has a cylinder and frame cast in a rigid self-supporting piece which forms a yoke for the top platen, a separate casting. The water-cooled main ram permits close tolerance between the rams and the cylinders' sidewalls. The hydraulic system is fully automatic. The self-contained heating system may be operated by high-pressure gas or electricity. The interchangeable form sliding plates are hydraulically driven at a variable, adjustable speed. The press is available in 300-, 500-, and 800-ton sizes. The 500-ton press has a pressure capacity of 1,250 pounds per square inch on the ram. It has a 25-inch ram and a platen 25 by 29 inches.

When producing rubber printing plates, the platens of the chilling press are in "low" position. The form assemblies are fed through the machine from the rear on to a portable table supporting the sliding plate between the front track extension. After the "close" button is pressed by the operator, the molding press closes, heating the preheated form assembly No. 2 from top and bottom and exerting the required pressure. Simultaneously the "preheating" press closes, heating form assembly No. 1 from top and bottom and exerting the required pressure for the second half of the curing period. After holding the gentle pressure of the molding press for 20 to 30 seconds, the operator slowly increases the pressure until the bearers become tight. At the end of the five-minute timing period the timer releases the pressure, opens the presses, resets itself for operation, and rings a signal indicating the end of the semi-cure in the molding press and final cure in the "preheating" press. Stereotex Machinery Co.

"Arrived O.K." Minnesota Mining & Mfg. Co., St. Paul, Minn. 12 pages. This profusely illustrated booklet covers methods of applying export packaging adhesives for sealing case liners, cartons, and containers. Beginning with illustrations of how to seal fiberboard boxes, the booklet goes on to illustrate how to make a waterproof liner, how to seal wooden shipping containers, how to seal flaps, and how to seal hard to wrap packages in containers.

Synthetic Rubber Mechanical Parts In Present and Postwar Vehicles-III[1]

Ellwood F. Riesing[2]

THE design of highly functional vibration absorbing elements operating under high frequencies and at elevated or depressed temperatures demands more complex studies of the dynamic properties of the compounded elastomers. The properties brought out by testing stocks with the ball rebound device, the torsional pendulum device, and the Yerzley oscillograph are all that are required for evaluating compounded elastomers for relatively low-frequency applications since these devices are free-fall or free vibration tests. However, since internal friction varies with frequency, some other means of studying and measuring the dynamic properties at the higher frequencies had to be developed.

Hysteretic and Elastic Properties

J. H. Dillon, I. B. Prettyman, and G. L. Hall, of our company, designed a resonance shear vibrator and a technique for obtaining the two fundamental dynamic properties of natural and synthetic rubber stocks. From these fundamental properties, dynamic modulus and internal friction measured at a definite frequency or frequencies, dynamic service characteristics may be predicted for any application provided the forces involved in the application are sufficiently determinable. With this apparatus the effects of various physical parameters such as superimposed static strains, frequency, amplitude of vibration, and temperature upon the dynamic properties were studied. In these scientific studies the "hysteresis index at constant maximum impressed strain" (internal friction multiplied by frequency) was found to be nearly independent of dynamic shear strain; while the dynamic shear modulus decreased moderately with increasing dynamic strain. Neither this "hysteresis index" nor dynamic shear modulus depended upon the shape factor of the insulator type stocks investigated. Dynamic shear modulus was found to be independent of frequency, and "hysteresis index at constant maximum impressed strain" only slightly dependent upon frequency for insulator-type stocks in the frequency range studied. This work also brought out the fact that at conditions well above resonance, energy absorption at constant force is proportional to internal friction divided by the square of the dynamic modulus, and at constant amplitude is proportional to internal friction. Figure 27 illustrates this apparatus, and Figure 28 shows the schematic drawing of it. The apparatus operates over a range of 20 to 300 cycles per second and can deform specimens in shear strains of 5% to 35%. It also can be operated in a temperature range under which the dynamic properties can be studied from —4° F. to 248° F.

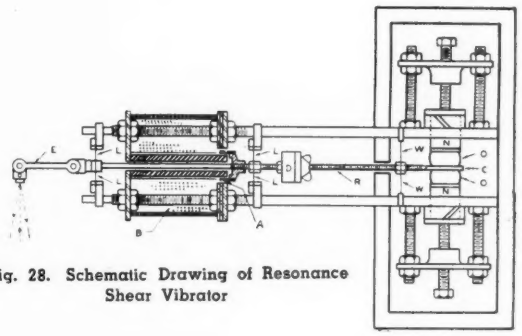


Fig. 28. Schematic Drawing of Resonance Shear Vibrator

Under the ball rebound study of impact resilience we stated that the impact resilience is a function of neither modulus nor internal friction alone, but rather a combination of both. Dillon, Prettyman, and Hall, with their resonance vibrator, made an interesting study of a series of butadiene-styrene stocks, compounded with polymers of varying butadiene-styrene ratios, which revealed that the dynamic moduli of all converged at a single point of 122° F., but were well apart at 212° F. Their study of internal frictions of these same compounds showed that the internal friction values converged at 212° F., but were well apart at 122° F. Yet the ball rebound impact resilience values were well apart at both 122° and 212° F. See Figures 29, 30, and 31. Note that the ball rebound impact resilience values on Figure 31 show the special 85-15 butadiene-styrene compound to be better in this respect than the natural rubber insulator-type compound over the temperature range indicated.

As a practical design value to engineers to aid them in their initial studies of resilient mountings, we are showing the "dynamic shear modulus" values measured at 60 c.p.s. under constant force for the five general-utility 50 durometer mechanical goods stocks covered in this paper. These are being shown at three different temperatures in Figure 32. To our knowledge this is the first time comparative "dynamic shear modulus" data have been published for five different elastomers, all compounded to the same durometer hardness and each having essentially an optimum combination of best tensile, elongation, and permanent set values.

In this hysteretic and elastic property study at 60 c.p.s. under constant force at specified temperatures, the five compounds brought out some extremely interesting relations. The comparison of values of "hysteresis index at constant maximum impresses stress" showed that with a rise in temperature from room temperature to 212° F., there was a measured reduction in hysteresis for neoprene, Butaprene, and Butyl; whereas natural rubber along with GR-S experienced increases in hysteresis, just the opposite of popular belief. In the measurements of the "dynamic shear modulus" of these compounds on the forced vibrator machine, under the stipulated conditions, neoprene (GR-M) showed a smaller amount of change over the temperature range from 85° to 212° F. than did the prewar natural rubber compound, which is a highly desirable condition for motor mountings. Here,

[1] Abstracted from paper presented at the War Engineering-Annual Meeting of the Society of Automotive Engineers at the Book-Cadillac Hotel, Detroit, Mich., Jan. 8 to 12, 1945. Final paper copyright 1945 by Firestone Industrial Products Co.

[2] Chief automotive engineer, Firestone Industrial Products Co., Akron, O.

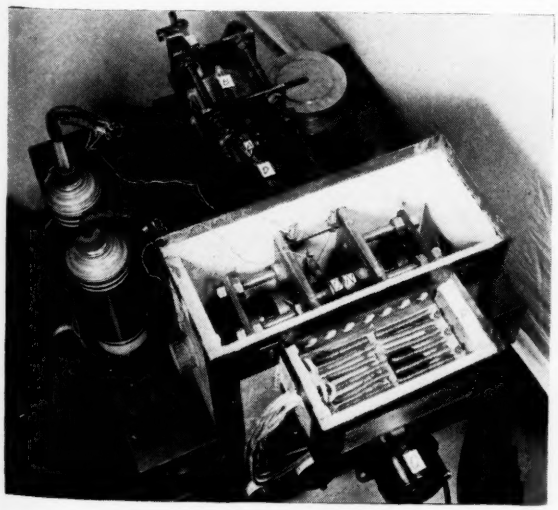


Fig. 27. Resonance Shear Vibrator

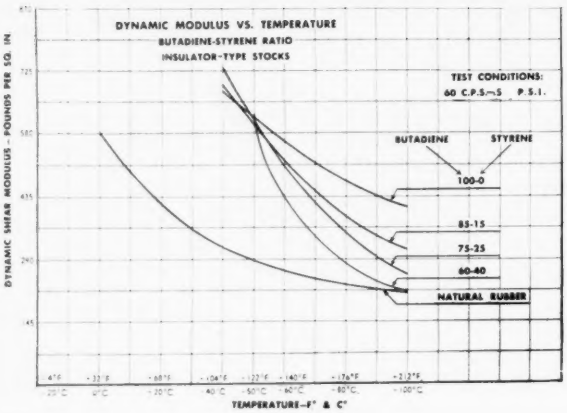


Fig. 29

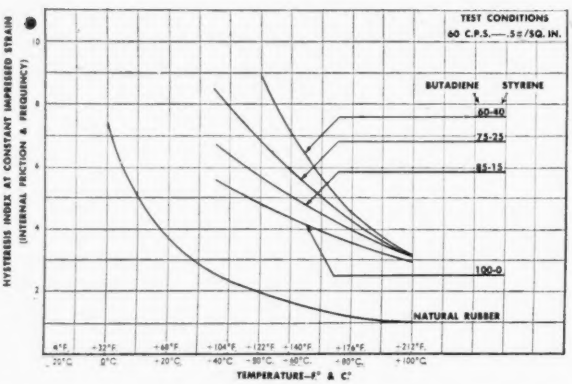


Fig. 30. Hysteresis Index vs. Temperature—Butadiene-Styrene Ratio —Insulator-Type Stocks

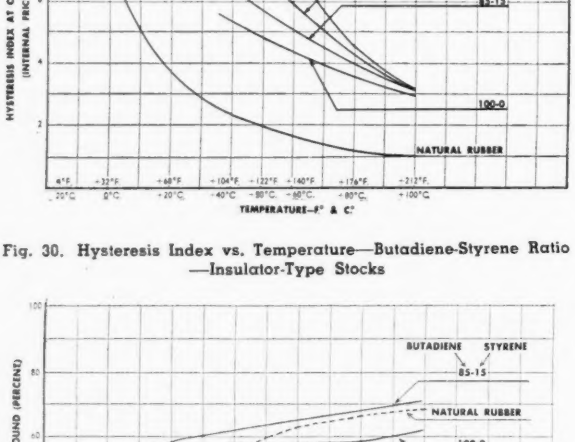


Fig. 31. Ball Rebound vs. Temperature—Butadiene-Styrene Ratio —Insulator-Type Stocks

again, one of the synthetics is superior to natural rubber.

Creep and Stress Relaxation under Load (at Elevated Temperatures)

The permanent change in shape of mechanical rubber goods parts such as resilient supports, subjected to load for relatively long periods, may become the major factor determining their useful life, especially in those applications involving elevated temperatures. Under continuous stress this unrecoverable creep results principally from a scission of the primary molecular bonds, slightly retarded by their subsequent reformation and from cross-linking bonds between molecular chains at new positions. The rate of scission can be readily and accurately determined by the use of a continuous fixed elongation of samples upon which periodic stress measurements are taken.

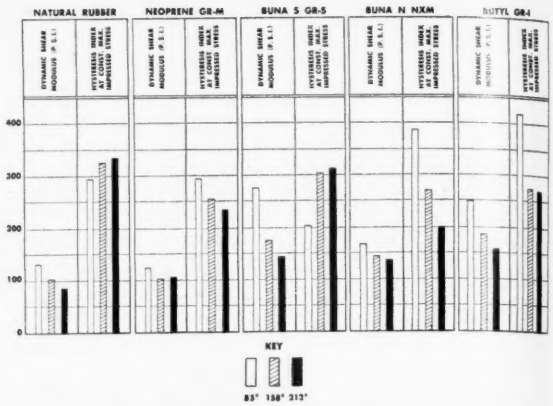


Fig. 32. Dynamic Properties—Five General-Utility Series Stocks-50 Durometer Compounds—Measured on Shear Vibrator under Constant Force and Constant Frequency-60 C.P.S.

Dr. Tobolsky, of Princeton, Dr. Dillon, Prettyman, and Hall, of our company, have done considerable work in investigating creep and stress relaxation under load by making their measurements on thin samples and conducting their work under both normal and atmospheric conditions and in pure nitrogen, in order to separate from their measurements the effect of oxidation. The apparatus used for this study of creep and stress relaxation under load is in Figure 33. To point out more clearly the working elements of this apparatus we have illustrated in Figure 34 the single unit which brings out the balance mechanism and the attachment of the specimen.

Figures 35 and 36 show the values plotted in curve form at two elevated temperatures. By a study of these curves it can be seen that two synthetic elastomers have a lower rate of relaxation than does natural rubber. Here again is another property where one or more of the synthetics are superior to natural rubber.

Change in Modulus with Time (at Elevated Temperatures)

In most mechanical rubber goods applications it is greatly desirable for the modulus (stiffness) of a compound to remain constant throughout the life of the product. In applications such as engine stabilizers, which carry practically no constant load, the chief stress involved is applied only intermittently and for relatively short periods of time. The change in modulus occurring under these conditions at elevated engine operating temperatures is of primary importance. Measurements of modulus change under the specified conditions can be determined on the same apparatus used for the stress relaxation measurements. Figures 36 and 37, therefore, also show such curves for the indicated elastomers; the measuring stress is applied periodically for ten-second intervals. It is seen that natural rubber and butyl soften and GR-S stiffens with time. For neoprene, however, the stress remains constant for an extended period before stiffening. Here, again, a synthetic is shown to possess a property superior to natural rubber.

Synthetic Rubber-Like Elastomers as Future Engineering Materials

The future possibilities of synthetic rubber-like elastomers as engineering materials are practically unlimited. We have just referred to Figures 36 and 37, describing both creep and stress relaxation under load and have also referred to change in modulus with time as investigated with present-day synthetic rubbers. Consider what the chemists may be able to do with proper blending of these various synthetic rubbers. Neoprene has exhibited the greatest creep and stress relaxation plotted against log time in the graphs—Figures 36 and 37, while GR-S shows the minimum of relaxation. In consideration of the change in modulus with time, these two synthetic elastomers reversed their positions. Certainly the blending of these two elastomers should yield some interesting results, and materials might be produced that could

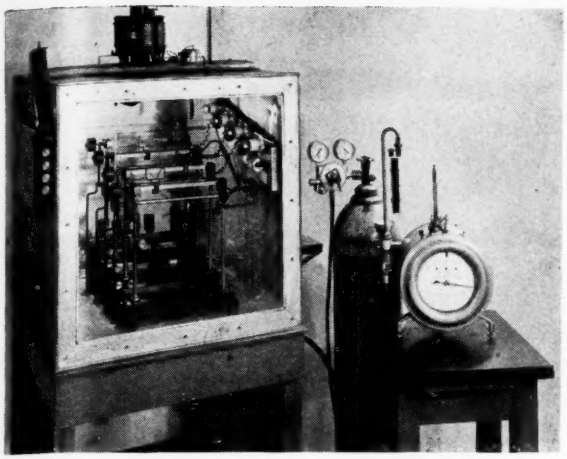


Fig. 33. Stress Relaxation Apparatus

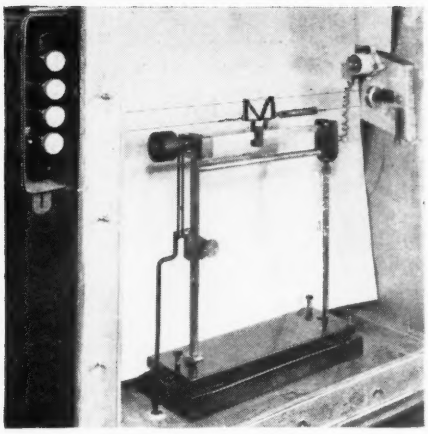


Fig. 34. Stress Relaxation Apparatus—Single Element

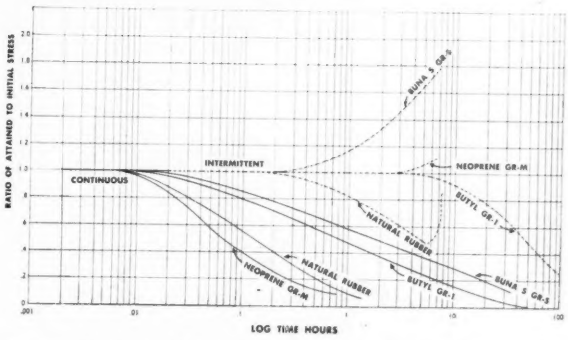


Fig. 35. Constant and Intermittent Stress Relaxation Curves (at Constant Elongation) Insulator Type Stocks 266° F.

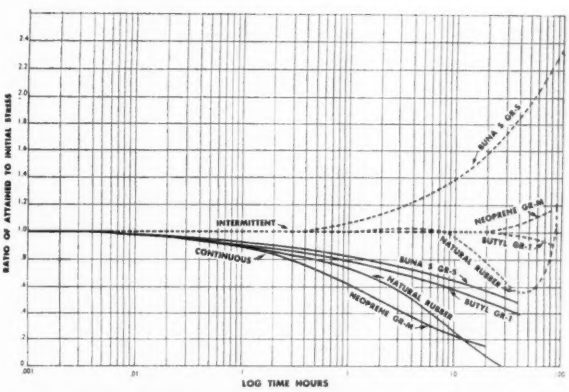


Fig. 36. Constant and Intermittent Stress Relaxation Curves (at Constant Elongation) Insulator Type Stocks 212° F.

be made available in the future which would excel natural rubber under both conditions described.

In our discussion of low-temperature properties we refer to special compounds of emulsion-polymerized polybutadiene. Unfortunately they are not on the market today, but when made commercially available some time in the future, they may prove to be the long-awaited answer to unusual application problems such as service at continuous extremely low temperatures in special refrigeration equipment. In such applications natural rubber could never be used as it becomes as brittle as glass under temperatures below —68° F.

Butyl is the newest of the present-day commercially available synthetics, and the real possibilities for its use in the future as an engineering material for mechanical goods applications is still to be investigated. The tremendous improvement in resilience of Butyl compounds resulting from rise in temperature from room temperature to 212° F. should make the use of this synthetic the answer to numerous application problems where this property is desired. The effect could never be obtained with any other previously discovered synthetic elastomer.

Greater improvements in Buna S copolymers can be expected because of the large number of variations possible in butadiene and styrene ratio contents.

This is true also of the Buna N group where the ratio of butadiene and acrylonitrile can likewise be varied. In addition to the two groups just mentioned, the butadiene-styrene, and the butadiene-acrylonitrile group, startling results can be anticipated from multi-polymerization of the butadiene with various other materials, plus the blending with various plastics.

For years there has been a demand for rubber-like material which would withstand temperature variations from —40° F. to +350° F. without charring or volatilizing and without shrinking or becoming brittle and having the least tendency to absorb water. Just recently a material was announced, Silicone rubber, that has all of these properties, and should prove to be the engineering material for dozens of special-purpose applications.

Dichlorostyrene-butadiene copolymers likewise recently have been announced. They should also prove very desirable engineering materials because of their compounded physical properties being a combination of those normally associated with natural rubber and some of the present-day semi-oil resisting synthetics.

In this paper we have shown that one or more of the present-day synthetics are superior to natural rubber in a vast number of different physical properties. With the further developments in the synthetic rubber-like materials, to which we have just referred, we can expect new materials that can be used for engineering applications where their performance will not even be approached by any other engineering materials used in the past, or available at present.

We have endeavored to point out through this paper, in the discussion of various physical properties of rubber-like materials, that with the present-day synthetic elastomers we are able to excel or out-perform natural rubber with one or more of the synthetics, in one or more of the properties of the particular compounds concerned. What industry needs for an engineering material is a synthetic, rubber-like elastomer that will excel natural rubber in all physical properties. This Utopian ambition is not at all outside the realm of possibility.

This paper would not have been possible, had it not been for the untiring efforts of Dillon, Liska, Prettyman, Hall, of our department of physics; Ebert, chief chemist of our mechanical rubber goods division, and his men, Eisinger, Bell, Prohaska, Fritz, and Shetler; and the work contributed by the Ford Motor Co.'s engineering department; the rubber chemicals division of du Pont; the synthetic rubber division of Standard Oil Co.; and the men of the automotive engineering division of our company, King, Smith, Beltz, Gillespie, Lane, and Chilton.

Bibliography

Neoprene as a Spring Material. F. L. Yerzley, *Trans. A.S.M.E.*, June 4, 1939.

Hysteretic and Elastic Properties of Rubber-Like Materials under Dynamic Shear Stresses. J. H. Dillon, I. B. Prettyman, and G. L. Hall, *J. Applied Phys.*, Apr., 1944.

Stress Relaxation of Natural and Synthetic Rubber Stocks. A. V. Tobolsky, I. B. Prettyman, and J. H. Dillon, *Ibid.*, Apr., 1944.

Effects of Low Temperatures on Neoprene Vulcanizates. F. L. Yerzley and D. F. Fraser, *Ind. Eng. Chem.*, Mar., 1942.

Neoprene. U. S. Department of Labor, Engineering studies suggested by WPB Rubber and Rubber Products Branch, Jan., 1944.

Semi-Conducting Rubber and Synthetic Rubber Compounds. A. E. Juve, INDIA RUBBER WORLD, Feb., 1941.

Structure and Elasticity of Rubber. L. R. G. Treloar, British Rubber Producers' Research Assn. Publication No. 47—Reports on Progress in Physics, 1943.

Why Is Rubber Elastic? L. R. G. Treloar, British Rubber Producers' Research Assn. Publication No. 35.

Butyl Rubber Properties and Compounding. J. P. Haworth and F. P. Baldwin, *Ind. Eng. Chem.*, Nov., 1942.

Butyl Rubber—A New Hydrocarbon Product. R. M. Thomas, E. I. Lightbown, W. J. Sparks, P. K. Frolich, and E. B. Murphree, *Ibid*, Vol. 32, No. 10.

Kinetics of Rubber-Like Elasticity. D. D. Eley, presented at a general discussion on "The Structure and Reactions of Rubber," Faraday Society, London, May 29, 1942.

Theory of Rubber Elasticity for Development of Synthetic Rubbers. H. M. James and E. Guth, *Ind. Eng. Chem.*, Nov., 1942.

Statistical Length of Rubber Molecules. L. R. G. Treloar, British Rubber Producers' Research Assn. Publication No. 45.

Thermodynamic Study of the Elastic Extension of Rubber. L. R. G. Treloar, British Rubber Producers' Research Assn. Publication No. 24. August, 1942.

Elasticity of a Network of Long-Chain Molecules. L. R. G. Treloar, British Rubber Producers' Research Assn. Publication Nos. 30 and 39.

Static Fatigue of Rubber. S. M. Cadwell, R. A. Merrill, C. M. Sloman, and F. L. Yost, paper presented at the Mar. 31, 1941 meeting of the SAE Detroit Section.

Natural and Synthetic Rubbers. H. L. Fisher, *Proc. Am. Soc. for Testing Materials*, 41, 1-31 (1941).

Effect of Lubricating and Hydraulic Oils. D. F. Fraser, *Rubber Chem. Tech.*, 14, 204-10 (1941).

Volume Change of Hycar OR-15 Compounds on Immersion. A. E. Juve and B. S. Garvey, *Ind. Eng. Chem.*, 34, 1316-19 (1942).

Properties of Some Synthetic Rubbers. L. B. Sebrell and R. P. Dinsmore, *S.A.E. Transactions*, 49, 368-79 (1941).

A Low-Temperature Stiffness Test for Elastomers. R. E. Morris, R. R. James, and E. R. Evans, INDIA RUBBER WORLD, Aug., 1944.

The Rubber Situation. R. F. Dunbrook, *Hexagon of Alpha Chi Sigma*, Jan., 1943.

Conductivity of Tread Stocks. L. H. Cohan and M. Steinberg, *Ind. Eng. Chem.*, Jan., 1944.

Some Relations between Stress, Strain, and Temperature in a Pure-Gum Vulcanizate of GR-S Synthetic Rubber. F. L. Roth and L. A. Wood, *Applied Phys.*, Nov., 1944.

Silicon Rubber. J. S. Seltzer, Westinghouse Electric & Mfg. Co.

A Short History of Neoprene. E. I. du Pont de Nemours & Co., Inc.

Synthetic Rubber Today. J. M. Crowe, *Scientific Amer.*, Sept., 1943.

Physical Characteristics of Synthetic Rubbers. J. N. Street and J. H. Dillon, *J. Applied Phys.*, Jan., 1941.

Rubber Mountings. J. F. Downie Smith, paper presented at joint meeting of the A.S.M.E. at Cornell University, Ithaca, N. Y., June 25-26, 1937.

Effects of Low Temperatures on Neoprene Vulcanizates. F. L. Yerzley and D. F. Fraser, *Ind. Eng. Chem.*, Mar., 1942.

Synthetic Rubbers: A Review of Their Compositions, Properties and Uses. L. A. Wood, U. S. Dept. of Commerce, National Bureau of Standards, Circular C427 (1900).

Outlook for Synthetic Rubber. Melvin A. Brenner, National Planning Assn. Pamphlet No. 32, Mar. 1944.

Effect of Low Temperatures on Young's Modulus of Elastomers. J. W. Liska, *Ind. Eng. Chem.*, Jan., 1944.

Some Low Temperature Properties of Elastomers. J. W. Liska and F. S. Conant, *J. Applied Phys.*, Nov., 1944.

Influence of Damping in the Elastic Mounting of Vibrating Machines. E. H. Hull, *Transactions A.S.M.E.*, APM-53-12.

Synthetic Rubber. S. A. Kogut, *Product Engineering*, Oct., 1944.

Use of Synthetic Rubbers in Molded Products. M. J. Sanger, INDIA RUBBER WORLD, May, 1944.

Rubber as a Load-Carrying Material. F. L. Haushalter, *S.A.E. Journal (Transactions)*, Jan., 1939.

Mechanical Characteristics of Rubber. F. L. Haushalter, *Trans. A.S.M.E.*, Feb., 1939.

Perbunan Properties and Compounding. R. A. Moll, R. M. Howlett, and D. J. Buckley, *Ind. Eng. Chem.*, Nov., 1942.

Drift and Relaxation of Rubber. M. Mooney, W. E. Wolstenholme, and D. S. Villars, *J. Applied Phys.*, Apr., 1944.

Systems Manifesting Superposed Elastic and Viscous Behavior. A. V. Tobolsky and R. D. Andrews, Princeton University.

Vibration Properties of Rubber-Like Materials—Dependence on Temperature. R. B. Stambaugh, *Ind. Eng. Chem.*, Nov., 1942.

Rubber in Vibration. S. D. Gehman, *J. Applied Phys*, June, 1942.

Synthetic Rubber. United States Department of Interior, I.C. 7242, May, 1943.

Rubber Materials Survey. McGraw Hill Research, New York, 1944.

Dynamic Fatigue Life of Rubber. S. M. Cadwell, R. A. Merrill, C. M. Sloman, and F. L. Yost, *Ind. Eng. Chem.*, Jan., 1940.

Summary of Data on Synthetic Rubber. Revised, July, 1944. The Rubber Manufacturers Association, Inc., New York.

Evaluation of Rubber and Rubber-Like Compositions as Vibration Absorbers. F. Yerzley, *Ind. Eng. Chem.*, Aug., 1937.

Advances in Rubber during 1944. J. W. Liska, *Rubber Age*, (N. Y.), Dec., 1944.

Advances in Rubber during 1943. J. W. Liska, *Mechanical Eng.*, Apr., 1944.

Tread Cracking of Natural and Synthetic Rubber Stocks. J. B. Prettyman, *Ind. Eng. Chem.*, Jan., 1944.

Static Electric Problems in Tires. J. W. Liska and E. E. Hanson, *Ibid.*, May, 1942.

Thermal Decomposition of Natural and Synthetic Rubber Stocks. J. B. Prettyman, *Ibid.*, Nov., 1942.

Application and Unusual Physical Properties of Synthetic Rubber. O. D. Cole, *Trans. A.S.M.E.*, Jan., 1943.

Dichlorostyrenes and Their Polymers. J. C. Michalek and C. C. Clark, *Chem. Eng. News*, Sept., 1944.

Use of Synthetic Rubber in the Automotive Industry from Viewpoint of Rubber Technologist. J. N. Street and H. L. Ebert, *Rubber Chem. Tech.*, Jan., 1941.

Arc Welded Rubber Plant Equipment

Welding a Rack for Rubber

IMPROVEMENT in the design of rubber plant equipment is a typical aspect of the applications of modern arc welding methods in industry. A large book rack for stocking uncured rubber was recently constructed for a large rubber company by The Portage Iron & Wire Co., according to a report of The Lincoln Electric Co. The arc welded structure consists of two end assemblies, each having a central vertical member of six-inch channel iron about 5½ feet long. This piece is supported by a base of three- by 2½- by ⅜-inch angle with two supporting braces of 1½-inches by ¼-inch bar stock. Six arms, consisting of two- by two- by 5/16-inch angle in four-foot, two-inch lengths, are welded crosswise to the main central channel. The various pieces were first positioned on a table bed to which is welded a series of small lugs. After locating the main vertical member and clamping it down at each end, the horizontal cross-members were butted against the lugs and intermittently welded in place. Shielded arc electrode for mild steel of 3/16-inch diameter was used throughout the job.

To form the completed unit, the two end structures were placed upright, four feet apart and connected by a top piece of two- by two- by ¼-inch angle, and the entire assembly was braced with two bars crossed at the center and welded all around at the points where the ends contact the uprights. The resulting rack is said to be much lighter than those of former construction and uses considerably less material. The same general welding construction principles are used in making large, heavy-duty standards used by the rubber company.

Partnership or Corporation; Which Is the Better Form of Doing Business?[1]

THERE is probably no more fundamental question than which form of doing business is most advantageous. Yet, contrary to what appears to be widespread belief, no single business form is *the* most advantageous for all enterprises. The legal, tax, and other consequences of each type of business organization as well as the results of a shift from one form to another, must be balanced carefully against each other and must be appraised in the light of the particular circumstances of each firm. Past experience is a risky guide—what was wise in 1936 may no longer be advisable, and what is best today may turn out to be most expensive in the postwar period.

Final decision on just the question of which is the most advantageous *taxwise*—and this article is primarily concerned with the tax aspects— must depend partly on estimates of future income and the necessity of distributing that income, partly on prognostications of Congressional and judicial tax action, and partly on guesses as to postwar economic conditions. The postwar legislative *probables* include: (a) elimination of the excess profits tax with the end of hostilities or shortly thereafter, (b) some reduction in corporate normal and surtax rates, and (c) only slight reduction in individual tax rates—but with the income tax ceiling cut from 90% to roughly 75%. The strongest *possibilities* is the elimination of the double tax on corporate profits. Many proposals along this line have been made, but no generally acceptable solution to the many problems involved has yet been reached. Any study of the relative tax advantages of corporations and partnerships must start with the two fundamental differences in their treatment.

Taxation Differences—Corporation vs. Partnership

First, corporations are not taxed at the same rates as individuals. A corporation is subject to a normal tax and surtax ranging from 25 to 40%, plus an excess profits tax of 95%. In addition it is subject to the capital stock and declared value excess profits taxes. On the other hand an individual is subject to a normal tax and surtax ranging from a low of 23% to a high of 94%. Of course, where a corporation is subject to the excess profits tax, or a substantial portion of its earnings is paid out in dividends, the corporation stands in a disadvantageous position compared with a similar non-corporate business. However the excess profits tax is not a permanent tax fixture. It will undoubtedly be repealed soon after the end of the war. And dividend payments are controllable to a substantial degree. Eliminating the excess profits tax and the double tax (first to the corporation and later to the stockholder) that comes when dividends are paid, the federal tax burden on corporations is, in general, lighter than on a comparable partnership.

Second, a partnership is considered to be inseparable from its partners. The double taxation of corporate income, the difference in treatment of partners and working stockholders for payroll tax and salary stabilization purposes, the taxation of corporate tax-exempt income, etc., are direct outgrowths of this second fundamental difference.

The payment of dividends, of course, is not completely within the control of the corporation since there is the punitive surtax for unreasonable accumulation of earnings to be reckoned with. However faced with the uncertainties and challenges of reconversion and the postwar period, a policy of accumulating earnings today would appear to be reasonable in the case of almost any operating corporation.

There are, however, at least two important tax disadvantages of the corporate form of doing business. Since a corporation is a separate entity, dividends received from a corporation do not retain any of the characteristics of the income out of which the dividends are paid. The result is that, as a conduit of profit, the corporation has the effect of converting *all* types of income into fully taxable income when distributed as dividends. Thus fully tax-exempt income, partially tax-exempt income, and capital gains all become fully taxable ordinary income when the income is disbursed as dividends. Partnership income, on the other hand, does not lose any of its characteristics by going through the partnership. If the partnership realizes a capital gain, the partner's share of that gain is still considered a capital gain. If certain income received by the partnership is tax-exempt, a partner need pay no tax on his share of it.

Another disadvantage of the corporate form lies in the fact that if a corporation runs into hard years, its losses cannot be used to offset any other income which the stockholder may have. A corporate loss (except for the carry-over and carry-back provisions) is a tax waste. On the other hand partnership losses can be applied to reduce any other personal income of the partner. Obviously this distinction is important only where an individual has a source of income outside of his business. Where a business is the only income source, it makes little difference, as far as the use of business losses is concerned, whether it is incorporated or unincorporated.

While a change from a corporation to a partnership may seem advisable because of the expected annual tax savings, the immediate tax cost of dissolving the corporation may make the change prohibitive. The fact that in a particular case the tax cost of converting from a corporation may exceed one year's tax savings should not, of itself, prevent the change since the annual savings may continue. However, if the tax cost of dissolving the corporation exceeds the expected savings for *several* years, a change to a partnership is usually not advisable. It is difficult to predict what tax rates will be several years hence, and it is probable that operating as a partnership may turn out to be comparatively less advantageous in future years.

Changing Partnership to Corporation, or Vice Versa

A partnership may transfer its property to a corporation solely in return for stock without realizing any taxable gain or loss if (a) the partners after the exchange have at least 80% of the outstanding voting stock and at least 80% of the total number of shares of all other classes of stock of the corporation, and (b) the amount of stock and securities received by each partner is substantially in proportion to the interest he had in the property before the exchange for stock. In most cases these requirements

[1] By the tax staff of The Research Institute of America, 292 Madison Ave., New York 17, N. Y.

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are automatically met in incorporating a business, and changing from a partnership to a corporation will usually involve no tax.

In a non-taxable transfer the basis of the property to the corporation will be the same as the basis of the property before its transfer to the corporation. However on a taxable transfer the basis will be the fair market value at the time of the transfer. Thus under certain circumstances it may be advisable to realize a taxable gain or loss:

1. The property has increased in value, and the partners are willing to pay a tax on the amount of capital gains in order to increase the basis of the property to the corporation.

2. The property has decreased in value, and the partner wishes to deduct the loss on his personal return.

Unlike the transfer of assets from a partnership to a corporation, the reverse transfer results in the recognition of gain or loss regardless of how the transaction is handled. However this can be turned into a substantial long-range tax benefit through a stepping up of the basis of the assets of the new, unincorporated business. Any increase in value of the corporate assets is taxable to the stockholders usually as a long-term capital gain and therefore subject to a maximum effective tax of 25%. On the other hand the increased basis may be used by the new business to reduce ordinary income which is probably subject to a substantially higher tax rate.

For example, if the A corporation has a closing inventory which cost $10,000, but has a market value of $20,000, corporate liquidation would result in a maximum tax to the stockholders (due to the increase) of $2,500. However, when the inventory is sold by the succeeding partnership in the following year, the income is reduced by the full $10,000 of increase, and if the owner is in a 50% bracket, the saving would be $5,000. The net tax saving therefore amounts to $2,500.

A change from a corporation to a partnership, or *vice versa*, has pitfalls other than the immediate tax liability involved in the switch. For example, the loss of the carry-over and carry-back of losses and unused excess profits tax credits may itself tip the scales against any change. Losses of both corporations and partnerships can be carried back or carried forward for two years. But where a corporation dissolves and then operates as a partnership, any losses incurred as a partnership *cannot* be used to obtain a refund of taxes paid by the former corporation. Furthermore the right of a corporation to carry back any unused excess profits credit will likewise be lost. Similarly, a corporation formed out of a dissolved partnership *cannot* apply its losses against the income of the partnership for prior years. Of course the unused losses can still be carried forward. But this practice involves a long-range speculation with too many unknowns. The one definite fact is that the losses carried forward will not be able to offset high-rate war taxes.

Another penalty may have to be paid for dissolving a corporation. The proceeds of any life insurance policies transferred from the corporation may lose their tax-exempt status. Life insurance proceeds are generally tax-exempt. However, when the policies are transferred for a valuable consideration, such as in return for stock, the transferee becomes taxable on the excess of the proceeds over the basis of the policy. Thus, if policies covering non-stockholder-employes are distributed on the liquidation of the corporation, the proceeds subsequently received will not be fully tax-exempt. The amount taxable will be the proceeds minus the cash surrender value at date of dissolution and the premiums subsequently paid.

Where the policies cover an employe-stockholder, a different rule apparently applies. The Treasury has held that where a policy is transferred to the *insured*, the proceeds still retain their tax-exempt characteristics. On the basis of this decision, where the policy is on the sole stockholder, the distribution of the policy to the stockholder would seemingly not make the future proceeds taxable. If the policy were on the life of only one of a number of stockholders, the future proceeds would presumably be taxable only as to the share belonging to the *uninsured* partners.

A transfer of a policy from an unincorporated business to a corporation in a tax-free transfer does not result in changing the tax-exempt nature of the insurance proceeds. Therefore the incorporation of a business does not face the problem involved in a corporate dissolution.

If a corporation has emergency facilities, its dissolution may result in the complete loss of the right to amortize the basis of the facilities over the short five-year period. The certificate of necessity does not follow the transfer of the assets, and it will be necessary for the successor partnership to secure a new certificate. The WPB is granting very few new certificates, on the ground that the change of business form is not necessary for the war effort. Failure to secure a new certificate means that the partnership must amortize the basis of the property over the useful life of the property rather than over a 60-month period. In addition the corporation by dissolving would appear to forfeit the right to increase its yearly amortization retroactively if the emergency period ends before its five-year period terminates.

If the change is a tax-free transfer from a partnership to a corporation, a closing agreement can frequently be obtained from the Treasury, permitting the corporation to continue the amortization started by the partnership. This closing agreement would do away with the necessity of a new certificate.

Conclusions

To sum up, it is impossible to say that the corporation or the partnership is the better form of doing business. The advantages and disadvantages of each and the cost of a shift from one form to another must be weighed in the light of the circumstances of a particular taxpayer. For example, while a certain corporation may decide that it would be more advantageous to operate as a partnership, the loss of an unused excess profits tax credit carry-back or the right to continue five-year amortization of war facilities may more than counterbalance the expected advantages. However, very generally speaking, it is our belief that the trend will shift from the partnership to the corporate form in the next few years. The elimination of the excess profits tax and the expected general reduction in business taxes after the war will be the prime inducing factors.

Improved Budding Method

An improved technique for budding *Hevea* is claimed by A. White and E. P. Inle, of the United States Department of Agriculture, who are now in Costa Rica working on rubber-growing problems. They observed that the growth of young *Hevea* is intermittent and that the tree produces successive flushes of leaves; the terminal bud remains quiescent between leaf flushes. Experiments showed that when there is any delay between cutting and using—which is likely to occur when budwood has to be transported—material cut in the quiet period gave a 50% advantage over that cut in the active period. It was further found that the percentage of budding successes could be greatly increased by girdling the stem nine to 14 days before cutting the budwood.

Commenting on this improved technique for budgrafting *Hevea*, C. C. Sharp, botanist at Dartonfield, Agalawatta, Ceylon, of the Rubber Research Scheme (Ceylon), writes to *The India Rubber Journal*:

"In an Advisory Leaflet issued by the R.R.I. of Malaya, it was pointed out that when either the budwood or the stocks were in a condition of very rapid growth, the percentage of successes in budding might be materially reduced. The reason for this is that when the scion unites with the stock, the tissues principally concerned in the first stages are developed from the medullary rays. Normally the medullary rays contain large reserves of starch which are required for the early growth of the union. It was also pointed out that if these reserves were reduced by the rapid growth caused by heavy manuring, a satisfactory union of the scion and stock might not take place.

"The two methods advocated are designed to keep the starch reserves in the budwood at a maximum, the first method by using the budwood at the end of a dormant period when starch would have accumulated in the medullary rays, and the second to check by ringing the passage of starch from the scion to the stock.

"The Costa Ricans claim a 50% increase in budding successes by using these methods. This implies that they do not as a rule get more than 67% successes and probably get less, compared with 90% that we normally expect in Ceylon. I think that the inference to be drawn from this is that in Costa Rica they have been overmanuring their nurseries or manuring them too close to the time of using the budwood and have been using these modifications in technique to remedy this. If I am right in this assumption, there is nothing to gain by adopting either of these proposals for it is simpler and more economical to obtain the same results by manuring correctly at the proper time."

Distribution of Rubber in Cryptostegia as a Factor in Its Recovery[1]

R. T. Whittenberger,[2] B. A. Brice,[2] and M. J. Copley[2]

ALTHOUGH *Cryptostegia* has long been known to contain rubber in quantity,[3] no extensive work on its commercial recovery had been done until the recent war emergency arose. In 1942 investigations on the recovery of rubber from *Cryptostegia* were begun in this laboratory and elsewhere.[4-9] The investigation in this laboratory dealt with the recovery of rubber from harvested stems and leaves and was not directly related to methods of recovery based on tapping or clipping twig ends of the growing plant.[4, 6, 7]

Early in the work difficulties were encountered, both in analytical and recovery procedures, of such a nature as to indicate that a substantial proportion of the rubber in the plant was not extractable by conventional methods expected to be applicable to plants having rubber as latex in a cell or duct system. Although analysis showed that most of the rubber in a two- or three-year-old plant occurred in the leaves, only a minor fraction of this rubber was recoverable by mechanical procedures, such as ball milling or crushing. Attempts to leach the rubber out of the leaves by immersion in latex-stabilizing solutions were also unsuccessful, as were all other treatments designed to recover the rubber as latex. In solvent extraction the initially recovered fraction had properties superior to those subsequently recovered. Finally, special chemical pretreatment was necessary for complete recovery by benzene extraction.

The present investigation was undertaken to ascertain the character and distribution of rubber in *Cryptostegia*, for the purpose of developing more satisfactory methods for its extraction. Heretofore it had been assumed that all the rubber in *Cryptostegia* occurred in a laticiferous duct system. This study has shown that although the relatively small quantity of rubber in stems is exclusively in the ducts, 85 to 90% of the rubber in mature *Cryptostegia* hybrid leaves occurs in individual chlorenchyma cells, and only 10 to 15% in the ducts. In addition the rubber-bearing *Cryptostegia* chlorenchyma cell has been found to differ from that of the rubber-bearing parenchyma cells of guayule[10] and pingue,[11] from which rubber is readily extracted by ball milling. Whereas the guayule cell contains rubber in the finely divided or latex state, there is no such latex in the *Cryptostegia* leaf chlorenchyma. These unexpected findings offer a full explanation for the difficulties encountered in the extraction of rubber from *Cryptostegia* leaves and should be of considerable interest to plant anatomists and physiologists.

The plants used throughout this investigation were principally *Cryptostegia* hybrid (*C. madagascariensis* Boj. x *C. grandiflora* R. Br.), grown in Florida and shipped under refrigeration to this laboratory. *Cryptostegia grandiflora* R. Br. also was used, some received from Cuba and Mexico, and some grown locally in a greenhouse.

Numerous microscopic observations were made on free-hand and microtome sections of both fresh and preserved stem and leaf tissues; these were supplemented by examination of unsectioned material under the dissecting microscope. Rubber was identified by staining with Calco Oil Blue Na.,[12] by solubility behavior, by micromanipulation, by X-ray diffraction studies, and by chemical analysis.[13]

Distribution of Rubber in Stems

Photomicrographs of stained sections of stems are shown in Figures 1 to 5. In the stems the rubber is found only in latex ducts; none has been observed in the cortex chlorenchyma. The ducts are scattered vertically throughout the pith and bark (phloem, phloem rays, and cortex), although a small number extend laterally in the wood rays and make possible an interchange of latex between the pith and bark. The ducts, occasionally branched and essentially without septa, range from five to 35 microns in diameter; the average is about 25 microns. In small stems (three to four millimeters in diameter) the pith ducts are larger and of more uniform size than those of the bark. The parenchyma cells adjoining the ducts frequently are gorged with starch grains, and some contain crystals (probably calcium oxalate).

The relative proportion of rubber in the bark and pith depends, of course, on the age, size, and development of the stem. Generally in stems of small diameter most of the rubber is in the pith; whereas in larger stems it is in the bark. An estimate based on the number of latex ducts, allowing for their variable size, indicates that in a young stem of three- to four-millimeter diameter approximately 75% of the total rubber occurs in the pith; the remaining 25% is present in the bark and, to a slight extent, in the wood. The pith of such a stem often contains from 300 to 400 latex ducts. Dissection and chemical analysis of three medium to large stems of seven-, nine-, and 17-millimeter diameter showed that 49, 64, and 74%, respectively, of the total rubber occurred in the bark. Viswanath *et al.*[9] report having recovered 0.96 and 0.07% rubber, air-dry basis, from the central pith and bark, respectively. No details, however, are given concerning the size of stems utilized, and it should be pointed out that the data were obtained by recovery rather than analytical procedures and indicate the concentration of rubber in tissues rather than the distribution of total rubber.

Distribution of Rubber in Leaves

Rubber is found in non-septate laticiferous ducts of the petiole and blade of the leaf. The ducts, present in approximately equal numbers in the tissue above and below the veins, parallel and branch with the veins. A cross-section of the midrib is shown in Figure 8, and typical vein patterns are shown in Figures 6 and 7. In a mature leaf the ducts are most numerous (50 to 100) and largest (10 to 25 microns in diameter) along the main vein; they decrease gradually in number and size with each decrease in size of the veins as they branch and ramify throughout the leaf blade. Associated with each of the 20 to 25 largest lateral veins are 10 to 20 ducts of about eight to 20 microns in diameter. Each of the smallest veins terminates with a single tracheid (Figure 7), and occasionally is devoid of ducts. A few of the smallest ducts may extend into the vein islets and into the non-vascular tissue at the periphery of the leaf. Individual leaves differ widely in the number of ducts and therefore in the amount of latex rubber they contain.

During the study of the leaf ducts, globules in the chlorenchyma cells were observed which behaved like rubber toward stains and organic solvents. Typical globules are shown in Figures 9, 10, 11, 12, 14, and 15; Figure 13 shows cells from which the globules have been removed by ether. The globules are found in all green cell types (palisade parenchyma, spongy parenchyma, guard cells) of the mature leaf, although they are most numerous (1% to 8%) and largest in the palisade layer. Their general correlation with the presence of chlorophyll may be physiologically

[1] Natural Rubber from Domestic Sources," Paper No. 6.
[2] Eastern Regional Research Laboratory, Philadelphia, Pa. One of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, United States Department of Agriculture.
[3] C. S. Dolley, *India Rubber J.*, 41, 1156 (1911).
L. G. Polhamus, H. H. Hill, and J. A. Elder, *U. S. Dept. Agr. Tech. Bull.*, 457 (1934).
[4] T. A. Fennell, *Rubber Age (N. Y.)*, 54 329 (1944).
[5] J. McGavack, unpublished reported, United States Rubber Co. (1943).
[6] R. Symontowne, INDIA RUBBER WORLD, 108, 148, 259 (1943).
[7] R. Symontowne, *Chemist*, 21, 291 (1944).
[8] H. L. Trumbull, *Ind. Eng. Chem.*, 34, 1328 (1942).
[9] B. Viswanath *et al.*, *J. Sci. Ind. Research (India)*, 1, 335 (1943).
[10] F. E. Lloyd, *Plant Physiol.*, 7, 131 (1932).
[11] Eastern Regional Research Laboratory, unpublished report on the Emergency Rubber Project (Jan., 1943).
[12] R. T. Whittenberger, *Stain Technology*, 19, 93 (1944).
[13] M. L. Swain, W. L. Porter, and C. O. Willits, unpublished report at the Eastern Regional Research Laboratory.

Fig. 1. Young Cryptostegia grandiflora stem, cross-section, 16X. Dark stained spots in pith and bark represent rubber in laticiferous ducts. Although much rubber inevitably was removed from the ducts during the preparation of the section, the distribution of rubber in a stem of small diameter (3 mm.) is indicated.

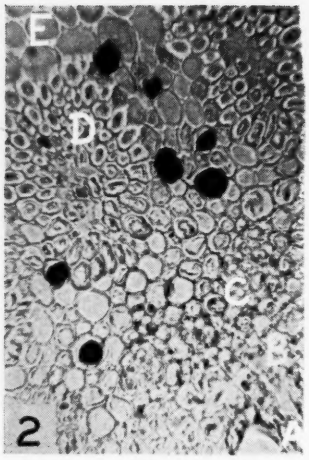


Fig. 2. Young Cryptostegia grandiflora stem, cross-section, 215X. Rubber is indicated by the dark stained areas. A, xylem; B, cambium; C, phloem; D, bast fibers; E, cortex.

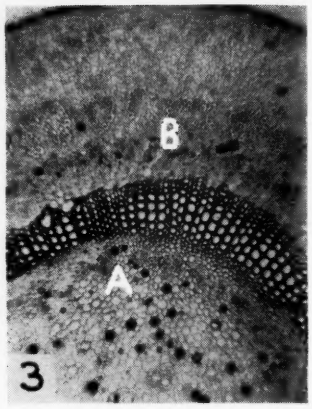


Fig. 3. Young Cryptostegia grandiflora stem, cross-section, 50X. Dark stained areas in pith (A) and bark (B) are rubber.

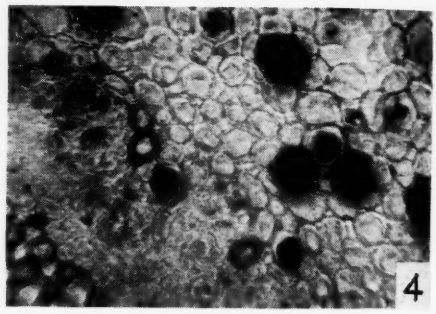


Fig. 4. Young Cryptostegia grandiflora stem, cross-section, 215X. Stained rubber in laticiferous ducts of the pith is shown. Xylem is seen at lower left.

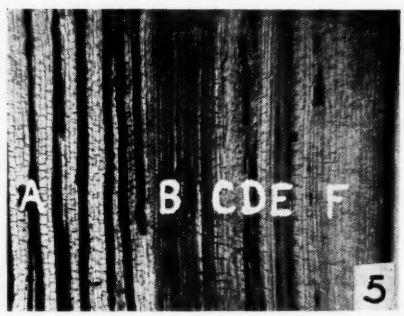


Fig. 5. Young Cryptostegia grandiflora stem, radial-longitudinal section, 50X. The extent of the laticiferous system is indicated by the stained rubber, although some rubber was removed and displaced during the preparation of the section. A, pith; B, xylem; C, cambium; D, phloem; E, bast fibers; F, cortex.

significant; the existence, in some cases at least, of very small globules in non-chlorophyllous parenchyma adjacent to the laticiferous ducts associated with the larger veins suggests a possible interchange of globular and duct material. Furthermore in the dorsal half of the leaf (spongy parenchyma) the globule-bearing cells are more numerous adjoining the ducts than in non-duct areas (Figure 14). Within the cell the larger globules are entirely distinct from the chloroplasts; whereas some of the smallest ones apparently are not. The globules may attain a diameter of 10 to 12 microns in the palisade cells, although smaller diameters (three to seven microns) are more common. It should be pointed out, however, that the globules vary greatly in size, frequency, and shape, depending upon the development, age, and previous history of the leaf. In young leaves only small globules, or none at all, are seen; in mature leaves of unusually high rubber content the chlorenchyma cells are heavily laden with globular material. In the latter cells many of the globules are distended to form oval or rod-shaped masses. These observations should be of value to physiologists in developing a theory of the mechanism of rubber formation in plants.

Identification of Rubber in the Globules of the Leaf Cells

The globules were clearly visible as pale yellow-green structureless masses, even in untreated sections of living mature leaves, as shown in Figure 9. These cell globules stained readily with Sudan III, alkanet, and Calco Oil Blue NA. A section bleached with Javelle water, extracted with acetone for 48 hours, and stained with Calco Oil Blue NA is shown in Figure 12. A similar section, bleached with Javelle water, extracted with ethyl ether for 24 hours, and stained, showed no globules (Figure 13). Similar observations with various solvents indicated that for the most part the globules were also soluble in benzene, toluene, xylene, carbon tetrachloride, and carbon disulphide. They were sparingly soluble in acetone, as shown by their decreased size after acetone extraction, and were only slightly affected by glacial acetic acid, Javelle water, chloral hydrate, and aqueous potassium hydroxide.

When subjected to tension by two micro-needles, a single globule stretched about tenfold before rupture. After rupture, the stretched threads quickly retracted, and two separate globules were formed. The globule, however, was tacky and stuck to the glass needle when punctured. These staining solubility, and micrurgical tests indicate that the globules contained rubber.

Further evidence on this point was obtained by chemical analysis of two carefully dissected fractions of the leaf, one essentially free of latex ducts and one essentially free of cells bearing the globules. From each of six *Cryptostegia* hybrid shoots three leaves were plucked, and the sample was divided into three lots. Only uninjured, non-chlorotic, turgid clean leaves were selected; some were young leaves near the apex; others were the older lateral leaves. No latex was lost from the leaves through exudation. They were infiltrated under suction successively with acetic acid, water, and dilute sodium hydroxide in order to coagulate any dispersed latex and to soften them sufficiently for dissection.

A complete separation of all the latex ducts from the remainder of the leaf was not attempted. However, since the quantity of latex duct rubber appeared to be closely correlated with the quantity of veins, it was believed that the removal of the main vein would remove a like proportion of the latex ducts. It was shown

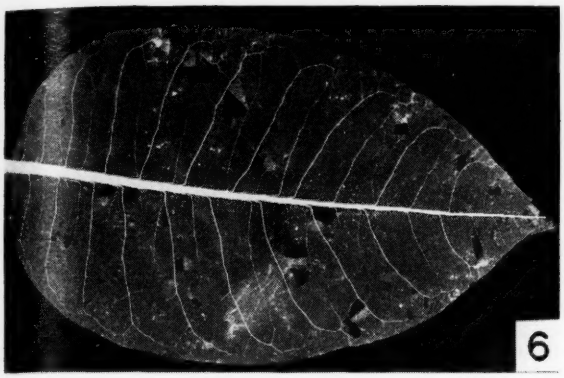


Fig. 6. Vein pattern of Cryptostegia hybrid leaf, 1X. The leaf was retted, and all tissue except the xylem of the veins was removed. The distribution of the xylem indicates the distribution of the laticiferous system. In a few areas the veins were damaged during preparation of the mount.

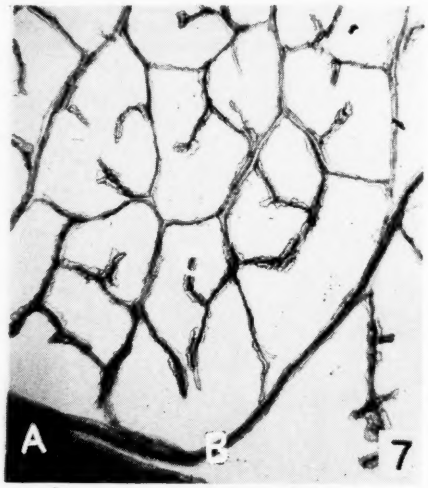


Fig. 7. Vein pattern of retted Cryptostegia hybrid leaf, 50X. A, midrib; B, small lateral vein; C, terminus of a veinlet. The laticiferous system has been removed, and only xylem remains.

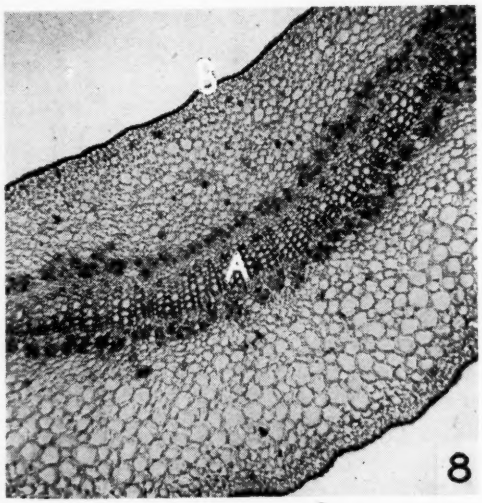


Fig. 8. Cryptostegia hybrid leaf, cross-section of midrib, acetone extracted, 50X. The stained areas surrounding the xylem (A) represent rubber in the laticiferous ducts. Approximately 100 ducts are associated with this vein. B, upper epidermis.

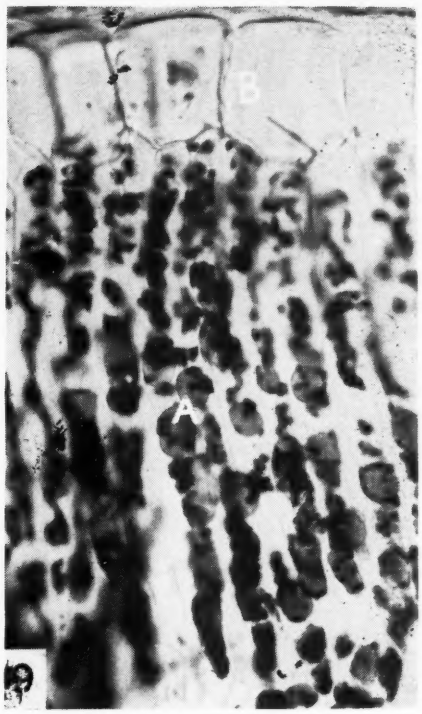


Fig. 9. Fresh, living, mature Cryptostegia hybrid leaf, cross-section, mounted in water, untreated, unstained, 460X. Rubber-bearing globules (A) surrounded by the darker, smaller chloroplasts in the palisade cells are shown. B, upper epidermis.

in a separate experiment on retted leaves (see Figures 6 and 7 for vein pattern) that the main vein, comprising the midrib and leaf stalk, contained more than half the xylem, by weight, of all the veins of the leaf. Since the globule-bearing cells are most numerous near the veins, extreme care was used in all cases in separating these cells from the veins under the dissecting microscope. The first lot of six leaves was separated into two fractions: 1(a) comprised the short leaf stalk, the main vein, and associated latex ducts, surrounded by epidermis; and 1(b) comprised the remainder of the leaf tissues. The second lot of six leaves was divided into three fractions: 2(a) was identical with 1(a) above; 2(b) comprised the largest lateral veins and associated ducts of each leaf; 2(c) comprised the remainder of the leaf tissues, including the smallest veins. The third lot of six leaves was not dissected and served as a control. All fractions were analyzed for total rubber. The results are shown in Table 1.

Table 1. Analysis of Dissected *Cryptostegia* Hybrid Leaf Fractions

Leaf Fraction	Weight of Leaf Fraction, Grams*	Acetone Extract, %*	Benzene Extract, %*	Rubber	
				Weight, Grams	% of Total Rubber
1(a) Main vein ...	0.1772	7.53	6.58	0.0117	8.96
1(b) Leaf tissue minus main vein..	1.2480	14.72	9.53	0.1189	91.04
2(a) Main vein ...	0.1569	8.87	4.27	0.0067	5.34
2(b) Largest lateral veins	0.0378	13.95	5.02	0.0019	1.51
2(c) Remaining leaf tissue	0.9341	15.82	12.52	0.1169	93.15
3 undissected leaf...	1.0611	15.42	9.75	0.1035	100

* Moisture-free basis.

The high figures for the benzene extract are undoubtedly due to the removal of some of the non-rubber plant constituents by the acid, water, and alkali treatments before dissection. However the distribution of rubber, as shown in the last column of Table 1, is not affected by this pretreatment. The results indicate that 85 to 90% of the total rubber of these leaves occurred in individual cells, that only 10 to 15% existed in latex ducts, and that most of the latex rubber in the leaf was present in the stalk and midrib.

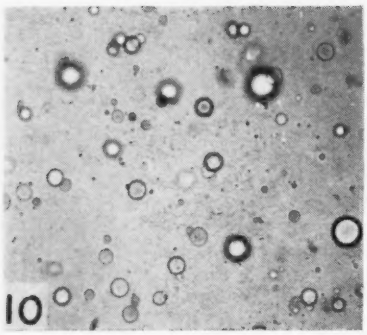


Fig. 10. Rubber-bearing globules isolated from Cryptostegia hybrid leaf chlorenchyma. 460X. Most of these globules are considerably larger than the rubber particles of the latex. Many of these globules are not in focus.

Fig. 11. Unstained palisade protoplast from retted Cryptostegia hybrid leaf. 860X. Three rubber-bearing globules partly surrounded by chloroplasts and protoplasm are evident. The cell was removed through the activity of microorganisms.

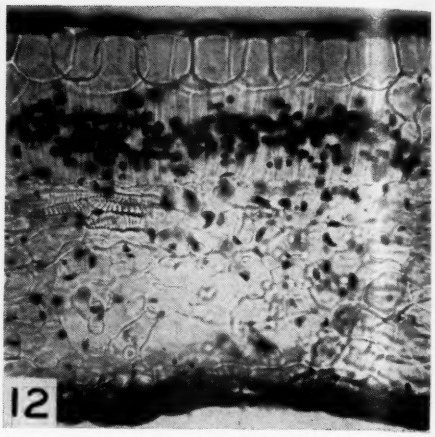


Fig. 12. Cryptostegia hybrid leaf, cross-section. 215X. The section was bleached with Javelle water, extracted with acetone for 48 hours, and stained with Calco Oil Blue NA. The stained bodies in the chlorenchyma are rubber.

Additional proof that rubber occurs in individual *Cryptostegia* leaf cells was furnished by isolating the leaf-cell globules and subjecting the isolated product to chemical analysis and physical tests. The isolation was accomplished by means of a process developed by Dr. Naghski and associates[14] for the recovery of rubber from *Cryptostegia* leaves. Special precautions were taken to assure the complete separation of the cell globules from the latex rubber.

Fresh, mature leaves of *Cryptostegia* hybrid were selected for the experiment. A representative leaf examined microscopically showed the presence of globules in the cells of the mesophyll chlorenchyma in great abundance (Figure 9). The rubber in the latex ducts was completely coagulated, as evidenced by its lack of Brownian movement and its elastic elongation. The leaves were retted anaerobically for four days with *Clostridium roseum* in a medium containing mineral salt. The vat contents were then stirred mechanically and finally filtered through a layer of cheesecloth. The filtrate was allowed to settle overnight, after a small amount of AgeRite was added to inhibit oxidation.

Microscopic examination of the unfilterable residue showed that it consisted of woody vein fibers, epidermis, latex ducts, strands of coagulated latex rubber, and a small quantity of cell fragments consisting of protoplasts with embedded globules. The settled layer from the filtrate consisted principally of chlorenchyma protoplasts with embedded globules, that is, essentially the original individual cell contents without the cell walls (Figure 11). No evidence of latex ducts or coagulated latex rubber was seen in this settled layer. Coagulated latex rubber may be recognized by its color, form, and granular structure. Some protoplasts with embedded globules and traces of latex duct fragments were found in suspension in the supernatant liquor.

The filtrate was centrifuged to sediment the protoplasts, and the supernatant liquid containing the traces of suspended latex duct fragments was removed by decanting. Separation of globules from the latex duct rubber was now regarded as complete. Two per cent. NaOH solution was then added to the moist sedimented fraction, and the mixture was boiled. As the boiling point was reached, the protoplasts began to disintegrate, freeing the globules (Figure 10). Then the suspension was centrifuged; this action produced on the surface a yellowish film composed of globules of various sizes, which spontaneously coalesced as the film dried. No evidence of protoplasts or coagulated latex rubber was found in this film. The dried film was yellowish, soft, tacky, and elastic and showed noticeable snap when stretched and released. The results of chemical analysis are shown in Table 2. Rubber was determined by precipitating the rubber as the tetrabromide.

It is pointed out that 7.91% of the crude product was nonrubber, benzene-soluble, acetone-insoluble material of unknown composition. The presence of rubber hydrocarbon in the acetone extract, as indicated by the analysis, might be expected if low-molecular weight rubber is present in the isolated product. Its presence in this extract was shown by precipitating the hydrocarbon gravimetrically as rubber "tetrabromide" and establishing the identity of the precipitate by a bromine analysis. Spectrophotometric examination of the benzene solution of the isolated product indicated the presence of pheophytin and carotene.

Table 2. Chemical Analysis of Fresh Mature *Cryptostegia* Hybrid Leaves (Starting Material) and the Globules Isolated from the Leaf Cells

	Original Leaves	Isolated Cell Globules
Wet weight, grams	3350	11.44
Dry weight, grams	450	8.66
Moisture, %	86.50	24.32
Acetone solubles by direct extraction, %*	9.39	29.56
Rubber hydrocarbon in acetone solubles, %*	..	3.75
Acetone solubles, non-rubber, %*	..	25.81
Acetone and benzene insolubles, %*	..	1.31
Total rubber hydrocarbon, %*	3.53	64.97
Non-rubber benzene-soluble acetone-insolubles, by difference, %*	..	7.91

* Moisture-free basis.

About 8.5 grams of the isolated cell globules, after being dried to about 16% moisture, were compounded according to a modified A.C.S. formula containing 50 parts of channel black. The vulcanizate had a tensile strength of 1200 to 1300 lbs./sq. in. and an ultimate elongation of 500%. These data do not necessarily indicate the quality of the rubber in *Cryptostegia* chlorenchyma cells since only one small sample was tested under a limited set of conditions. A more complete evaluation of the character and properties of the leaf-cell rubber will be published elsewhere.[15]

Final proof of the existence of rubber in the isolated cell globules was furnished by X-ray diffraction studies. At 320% elongation slight arcing of the innermost amorphous ring became evident. At 450% elongation eight crystalline reflections became visible. The interplanar spacings determined from these discrete reflections agree, within the limits of experimental error, with those of stretched *Hevea* rubber, indicating the presence of a *cis*-polyisoprene molecular structure.

Discussion

Microscopic observations of the rubber-bearing leaf cells during extraction experiments reveal the reasons why the rubber in these cells is not readily isolated and permit observation of the effects of various treatments. When untreated leaves are ball-milled, a moderate proportion of the cell walls are fractured. Although some of the rubber-bearing globules are liberated from the cell walls, they are not necessarily freed from the protoplasts, which prevent them from agglomerating into larger masses. Upon continued milling, however, the laticiferous duct rubber, supplemented by a fraction of impure globules, agglomerates into small masses or "worms." Usually these crude rubber masses

[14] J. Naghski, J. W. White, Jr., S. R. Hoover, and J. J. Willaman, unpublished report at the Eastern Regional Research Laboratory.
[15] T. J. Dietz, J. W. White, Jr., J. Naghski, and S. R. Hoover, unpublished report at the Eastern Regional Research Laboratory.

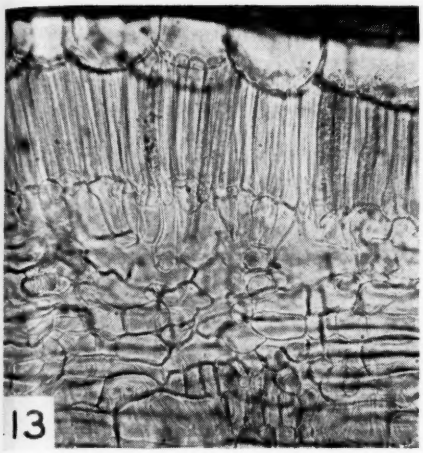


Fig. 13. Cryptostegia hybrid leaf, cross-section, 200X. The section was bleached with Javelle water, extracted with ether for 24 hours, and stained with Calco Oil Blue NA. No rubber remained in the section after ether extraction.

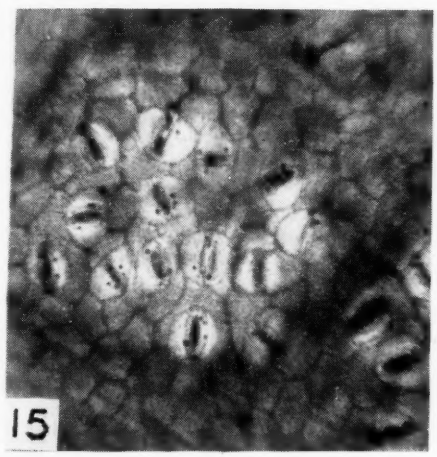
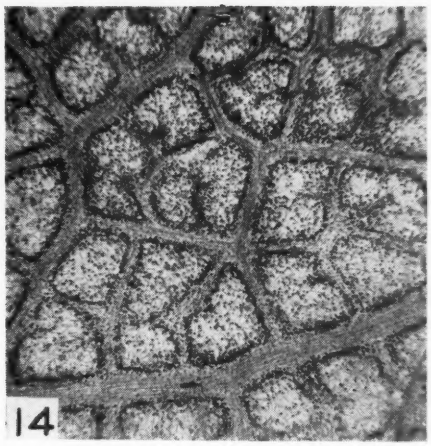


Fig. 15. Cryptostegia hybrid leaf, lower epidermis, treated with Javelle water, stained with Calco Oil Blue NA, 215X. The dark bodies within the guard cells aparently are rubber bearing.

(Right)
Fig. 14. Cryptostegia hybrid leaf, longitudinal section of spongy mesophyll, treated with Javelle water, stained with Calco Oil Blue NA, 50X. Small, stained, rubber-bearing bodies of the chlorenchyma, most numerous in areas adjacent to the veins, are visible. The branching network of the background represents the fraction of the lower epidermis made visible by removal of the veins.



are so highly contaminated with cellulosic and proteinaceous leaf matter that they sink in the flotation tanks and are therefore not readily separable from the non-rubber leaf debris. Only the relatively pure rubber masses float and are recovered. After a milling period of three or four hours the major portion of the leaf rubber is still found as scattered microscopic particles (globules), occluded by either the protoplasmic layers or the cell wall, or both. Pretreatment of the leaves, such as autoclaving with 2% sodium hydroxide or 2% sulphuric acid, although effective in reducing the total non-rubber leaf solids, does not by itself or in combination with milling result in the complete removal of the cellular barriers to rubber recovery. Greater success in rubber recovery accrues from the complete removal of the cell walls by retting followed by alkali dispersal of the occluding protoplasmic layers.[11]

The failure of many extraction experiments based on the assumption that all the leaf rubber occurs as latex in a duct system is readily explained by the anatomical findings. It is apparent that only a small quantity of rubber can be bled or leached from fresh leaves into latex-stabilizing solutions, since only 10 to 15% of the rubber occurs in a duct system. Likewise, attempts to obtain high recoveries by crushing or pressing rubber latex from the leaves are unsuccessful.[7, 8] Even when fresh leaves are rather finely macerated under a latex-stabilizing solution by a Buffalo or similar cutter, but little latex (always less than 10% of the total leaf rubber) is liberated into the solution. Most of the rubber remains unrecoverable as globules, occluded primarily by the protoplasts and, to a lesser extent, by cell walls.

The unusual disposition of rubber in *Cryptostegia* leaf is largely responsible for the difficulties encountered in developing an analytical method for the determination of rubber in the leaf. If ground leaves are extracted with acetone for 20 hours and then with benzene for 24 hours, a large portion of the rubber remains unextracted in the residue. No better results are obtained if the acetone-benzene extraction is preceded by a cold-water leach of the leaves. Microscopic examination of the extracted residue shows that most of the rubber has been removed from the laticiferous ducts, but that appreciable quantities remain in the unruptured chlorenchyma cells. However pretreatment of the leaf, such as autoclaving with dilute oxalic acid,[10] which alters the permeability or destroys the structure of the protoplasmic and pectinaceous layers surrounding the cell rubber, permits the complete extraction of resins and rubber. If such an extraction is followed microscopically, it is seen that, contrary to results with leaves not pretreated, the cell rubber is removed at a rate considerably faster than that for the duct rubber. Complete extraction is accomplished also after pretreatment with dilute sulphuric acid[10] although the extracted rubber is highly contaminated with non-rubber constituents.

Summary

Rubber occurs in *Cryptostegia* both in a laticiferous duct system and in individual leaf chlorenchyma cells. The ducts occur principally in the stems, but extend into the leaves, paralleling the vein system. Dissection and chemical analysis indicate that 85 to 90% of the rubber in a mature *Cryptostegia* hybrid leaf exists in the chlorenchyma cells and the remaining 10 to 15% in the ducts.

That the globules occurring in the chlorenchyma cells contain rubber is indicated by staining, solubility, micrurgical, dissection, and analytical tests on leaf sections; it is proved beyond question by chemical, physical, and X-ray analyses of globules isolated in quantity. These globules contain approximately 65% rubber hydrocarbon, apparently of low molecular weight.

The occurrence of the major part of the rubber in the leaf as globules entrapped in protoplasts and surrounded by cell walls accounts for the difficulties encountered in extracting rubber from *Cryptostegia*. These findings have been valuable in indicating new lines of approach to the problem of extracting rubber from *Cryptostegia* and in providing new information regarding the formation and storage of rubber in this plant.

We gratefully acknowledge the cooperation and suggestions of the members of this Laboratory who worked on the Emergency Rubber Project. Special credit is due Albert Kelner, who first observed the cell globules and suspected that they contained rubber.

[10] D. Spence and M. J. Caldwell, *Ind. Eng. Chem., (Anal. Ed.)*, 5, 371 (1933).

EDITORIALS

Rubber Program Needs Continued Strong Leadership

HALF of the war is now over, and we are all more than thankful for the final complete victory over Germany; but obviously there is no way of knowing with any degree of certainty whether the biggest job has been done or the biggest job still remains to be done. We have no choice, therefore, but to assume that victory over Japan will require a greater effort, both on the actual battlefronts and also on the home war production front than that called for to achieve the defeat of the German fanatics.

In this connection the rubber industry has already been told by John L. Collyer in Washington and by A. L. Viles in New York and by other leaders from coast to coast that military and essential civilian requirements for rubber products will remain at a very high level during the present year, at any rate. It is true that apparently some of the planning has not been too accurate. There are an excess of small truck tires and a very great deficiency of large truck tires; the bogie wheel expansion program was apparently overexpanded and has therefore been cancelled; but third-quarter military requirements are still higher than can be met even if production from present facilities was maintained at the record March rate, and the home-front needs of truck and bus tires is critical.

Under these conditions it is hard to see much justification for the recent pressure brought to bear by the URWA (CIO) on the WPB Rubber Bureau for drastic curtailment of the WPB's tire expansion program. The new facilities planned were in excess of the demands of a war against Japan alone, but based on the recent record of work stoppages in the tire industry and the vote at the Akron plants of the Goodyear Tire & Rubber Co. on May 28 for a general strike, the oft-repeated promise of the URWA to "get the most out of existing facilities" and in this way eliminate most of the planned expansion projects has a hollow sound.

A new survey of home-front tire needs has just been completed by the WPB, and this will most likely be compared with revised military needs at a meeting of the WPB Rubber Industry Advisory Committee in Washington, May 31. It is hoped that the Armed Services will be able to reduce their demands sufficiently to permit a sizable amount of past, present, and future production to be released for essential civilian use. Following the URWA-WPB conference, a WPB statement said in part: "It is obvious that the war machine can function at maximum efficiency only when backed by an efficient war-supporting economy at home. . . . There will come a time, of course, when redeployment of personnel and equipment will have been completed, when victory in the Pacific is in sight, and when military necessities on the home front will have lessened. But that time is not yet."

As stated during April by the Committee for Economic Development, "the period between V-E Day and V-J Day will be a confusing one" and "in the period following V-E Day, Government will have two problems: (a) intelligent resistance to pressures which might interfere with the Japanese War or throw the economy out of balance; (b) wherever possible the speedy and effective relaxation of controls to stimulate civilian production." All these things would seem to indicate that the present strong leadership that has resulted from the appointment of John L. Collyer as director of rubber programs must continue until the end of the war in the Pacific, if this war is to be concluded as speedily as possible.

When Mr. Collyer was prevailed upon to accept the job in Washington of eliminating the bottlenecks in the rubber program, he specified that he would serve for a period of three months, and most of the additions to his staff have agreed to join him under the same conditions. These three months will be ended on June 21, and although much progress has been made, if Mr. Collyer and his new staff leave Washington at that time, it is more than likely that the effect on the administration of the rubber program will be severe at a time when we cannot afford to have any of its vital projects sidetracked and when the rapidly changing conditions between V-E Day and V-J Day call for the best brains in the industry in making the proper decisions regarding continuation or cancellation of special programs.

The fact that the success of our military operations is dependent to a very great extent on the efforts of the rubber industry has been emphasized by Mr. Collyer himself in an article in the February, 1945, issue of INDIA RUBBER WORLD, when he said: "If the vital importance of the rubber industry to the nation needed any emphasis, that has been provided in the fact that after each of the two major military setbacks of this war—Pearl Harbor and the recent enemy offensive in Europe—it was rubber that was spotlighted as the nation's chief industrial emergency."

Tremendous tasks lie ahead in the Pacific, including the biggest amphibian operations of the war, according to no less authority than Gen. Alexander A. Vandegrift, Commandant of the United States Marine Corps, who certainly should be in a position to know. Such operations will require a very great number of the products of the rubber industry, as will the operations of the Army and Navy Air Forces, who will also be called upon for an ever-increasing effort.

To win the war against Japan as soon as possible and to avoid any "major military setbacks," and any major breakdown of rubber-tired transport on the home front, John L. Collyer and his present staff must remain on the job in Washington until final victory is assured.

Scientific and Technical Activities

Thomas Receives A. I. C. Gold Medal

ABOUT two hundred members and guests of the Miami Valley Chapter of the American Institute of Chemists met at a dinner-meeting at the Hotel Deshler-Wallick, Columbus, O., May 11, for the presentation of the Gold Medal of the Institute to John W. Thomas, chairman of the Firestone Tire & Rubber Co. The award was made in recognition of Mr. Thomas' numerous personal scientific achievements, for his executive ability in translating research results of the Firestone laboratory into large-scale production, and for his leadership in the development of the American synthetic rubber program.

E. L. Luaces, chairman of the Miami Valley Chapter, presided at the meeting and made the introductory remarks. Gustav Egloff, president of the Institute, made the presentation. Other speakers included Hezzleton E. Simmons, president of the University of Akron, whose subject was "John W. Thomas—The Man," and Col. Bradley Dewey, president, Dewey & Almy Chemical Co. and president-elect of the American Chemical Society, who spoke on "John W. Thomas—Chemist and Administrator." In his acceptance address, Mr. Thomas emphasized that Science, in the World of Tomorrow, may hold the balance of power between peace and war—between human happiness and world tragedy. Science, with its limitless capacity for eliminating want and creating plenty, may develop the long-sought formula for a lasting peace, he said.

Dr. Simmons in his talk described, first, Mr. Thomas' early life and scholastic achievements and stated that two of Mr. Thomas' college professors in particular had left a permanent transfer of personality upon him. Carl F. Kolbe, his German professor, in addition to teaching him that language, subjected him to the stern realities of discipline and directness, and C. M. Knight, professor of chemistry and a sympathetic, considerate, scholarly, soft-spoken New England gentleman, left an imprint on Mr. Thomas which still can be seen. Dr. Simmons related how, when Mr. Thomas left college in June, 1904, he entered the employ of The B. F. Goodrich Co. as a chemist, under A. E. Warner, then the company's chief chemist. It was mentioned that the medalist had developed the scientific approach in his college training and that he has used it on all problems, whether these were chemical, financial, or administrative. This approach is typified by three questions applied to these problems: namely, "What is it?," "How do you know it?," and "What of it?"

In 1908, Mr. Thomas came under the instruction and guidance of another shrewd, sagacious, far-seeing instructor, an entrepreneur in the rubber industry, Harvey S. Firestone, Sr., who hired him to equip and operate the first chemical laboratory for the Firestone company. Mr. Thomas rose rapidly, becoming general superintendent of the Firestone plants in 1911, a director of the company in 1916, a vice president in 1919, president in 1932, and chairman and chief executive in 1941. Although his increasing administrative duties removed him farther and farther from the laboratory, he still continues to watch over the activities of his company's chemists, it was stated. As one of the first major industrial executives to consider research a major arm of business, he has insisted that the chemical budget was just as important to the growth of a company as the sales budget.

Mr. Thomas (Right) Holding the Institute Gold Medal; Gustav Egloff, (Left) President of the Institute; E. L. Luaces, Chairman of the Miami Valley Chapter in the Background

Dr. Simmons described the activities of Mr. Thomas as a member of the board of directors of the University of Akron and particularly his service as chairman of that board for 16 years. It was revealed that in further recognition of Mr. Thomas' achievements in the industrial world, the University of Akron will confer upon him the honorary degree of Doctor of Science at the commencement convocation on June 4. In conclusion, Dr. Simmons said that the American Institute of Chemists brings honor to its own organization when it recognizes and pays tribute to John W. Thomas.

Colonel Dewey's Address

Colonel Dewey, the former Rubber Director, began his address by saying that today we are living in an era when the leadership of the chemist and engineer is taken for granted, but reminded the audience that we are less than two generations away from the time when it was axiomatic that no chemist could ever be practical enough to be a man of affairs and run a large business. He stated that the Institute award was being given to Mr. Thomas as one of the men who was big enough to break down these barriers and to show that a technical education, based upon orderly thought and reasoning from observed facts, is the finest possible training. Colonel Dewey paid tribute to the ability of the Firestone company under Mr. Thomas' leadership, with its experience as a large worker of metals as well as a molder of plastics and a maker of textiles, which enabled it to make not only rubber products and synthetic rubbers, but also a host of other tools of war that have helped whip one enemy and will soon finish Japan.

Colonel Dewey stated that John W. Thomas was one of America's foremost advocates of continuing the operation of a substantial part of our synthetic rubber plants, even after natural rubber becomes available again in plentiful quantities. While on the subject of synthetic rubber, the speaker emphasized strongly that the rubber industry of the United States, large and small and aided by the chemical and petroleum industries, made possible the prosecution of this war. Without its wholehearted, complete cooperation we hardly could have gone to war, let alone have carried it on. Under Mr. Thomas, Firestone's part in this war was not limited to the manufacture of goods, but also to the help it gave and is giving in loaning the services of such men as E. B. Babcock and now J. E. Trainer for the administration of the national rubber program, it was pointed out.

Mr. Thomas' adherence to the Firestone doctrine that the low-cost producer need never fear and the ways in which he managed the Firestone company to obtain low-cost production were described. John W. Thomas is exacting of others and equally exacting of himself, Colonel Dewey concluded. Judged by his works, he has made good for himself and for his company, and in so doing has made good for the chemist in industry. If you judge Mr. Thomas by his works, you judge him a fitting recipient of this great medal, it was said.

Thomas' Acceptance Address

In accepting the Institute Gold Medal for 1945, Mr. Thomas paid tribute to all those men of science in the rubber industry who have contributed so much to the progress of civilization and toward ultimate victory in this war. American scientists not only accomplished a near miracle in finding a substitute for natural rubber that could be produced quickly and in great quantities, but they have given us not one, but many types of synthetic rubber, and it will take a number of years before we will be able to utilize fully these many tailor-made products of our laboratories, he stated. But the responsibilities of science in the past are small compared with those it will accept in the future, he added. It is a sobering thought to realize that science, in the World of Tomorrow, may hold the balance of power between peace and war—between human happiness and world tragedy.

"If every nation could possess within its boundaries all the raw materials it needs to live and to prosper, there would be little, if any, cause for wars. Many people think that such a condition would indeed be Utopia, and yet I am convinced that we are slowly approaching the time when this fascinating dream may, at least in part, become a joyful reality through the medium of scientific research," Mr. Thomas said.

He cited the development and production of synthetic gasoline and synthetic rubber as classic examples and stated that men now living may well see the day when a nation's true hidden wealth will not consist of her natural raw materials, but rather consist of her men of science and their laboratories.

"I can recall vividly the days when a tire that would run five thousand miles was the goal of the rubber industry. Yet today it is no trade secret that we expect ultimately to produce a tire that will last a hundred thousand miles, and it may be made of a substitute for natural rubber," said Mr. Thomas.

He then went on to predict that we may some day be able to build comfortable, beautiful, low-priced homes by using such materials as plastics, glass, and other chemical combinations, the properties of which we are just beginning to learn. He also mentioned better foods, improved air conditioning, freedom from disease, the miracle of television, synthetic fibers as strong as steel and yet as light as magnesium, and the partially explored field of electronics, as some of the possibilities of this fascinating World of Tomorrow.

"Free minds of science will unlock the stubborn secrets of nature," he said and added that this brought him to the kernel of his own philosophy. "Permanent peace is the dream and pledge of all mankind, and science may well be the chosen arbiter to bring this about," he concluded.

The Firestone sound film "Freedom Rides on Rubber" was then shown.

Trenton Chemical Society Meets

THE newly formed Trenton Chemical Society mentioned in the May issue of INDIA RUBBER WORLD and originally designated as the Trenton Technical Society, held its second meeting at Kelly's Restaurant in Trenton, N. J., on May 1. The meeting, which was preceded by dinner, had about 50 members and guests in attendance. The speaker was Irving W. Ruderman, of the Panelyte Division of the St. Regis Paper Co., who spoke on "The Isolation of Some Poly-Nuclear Substances from the Phenol-Formaldehyde Reaction."

Mr. Ruderman reviewed some of the research carried out by various workers investigating the phenol-formaldehyde reaction, starting with the work of Lederer, Manasse, and others. He mentioned that the original mechanism, as suggested by Baekeland: namely, that the growth of the chain stops when six phenols have entered and that an extra hydrated formaldehyde forms an inner anhydride with the six phenol chain, was soon displaced. He then described the mechanism, as suggested by Raschig, and the further investigations of Megson, who starting with Raschig's sugestion that the reaction proceeds first through the formation of phenol alcohols which can condense to form dihydroxydiphenylmethanes, etc., proposed that the condensation continues simply by the elimination of water through the condensation of alcohol groups with open hydrogen atoms. Branching and cross-linking in three dimensions of the low polymers finally result in a complex network of phenol molecules linked by methylene groups. Mr. Ruderman then reported on work done by Dr. Niederl and himself at New York University in which, instead of condensing phenol with formaldehyde, a phenol was condensed with a phenol alcohol under controlled conditions. It was found that the condensation of the partially blocked phenols, 4-tt-octylphenol and p-cresol with p-cresol dialcohol and 4-tt-octylphenol dialcohol, respectively, proceeded beyond the tri-nuclear stage to form high molecular weight polymers, the speaker reported.

At the meeting the articles of the constitution of the new society covering its name and the territory it will cover, membership requirements, dues and fees, were adopted to provide a working basis until the whole constitution for the society can be completed.

The next meeting is scheduled for June 5 at Kelly's Restaurant in Trenton.

Gilliland Receives Baekeland Award

Edwin R. Gilliland

THE Leo Hendrik Baekeland Award established last year by the North Jersey Section of the American Chemical Society and the Bakelite Corp. to commemorate the technical and industrial achievements of Dr. Baekeland and to encourage younger American chemists to emulate his example was presented to Edwin R. Gilliland, former Assistant Rubber Director, at the Essex House in Newark, N. J., on May 14. The award, consisting of a gold medal and $1,000, is made biennially to an American chemist under 40 in recognition of accomplishments in pure or industrial chemistry. Dr. Gilliland, professor of chemical engineering at Massachusetts Institute of Technology, now on duty with the Office of Scientific Research and Development in Washington, is the first recipient of the Baekeland Award. His achievements are both academic and industrial—at 36 a full professor of chemical engineering at M.I.T. and an authority on heat transmission, diffusion, distillation, and high-pressure synthetic chemistry, and under Col. Bradley Dewey the completion of the task of building from bare ground and very little raw material and from the ideas of research workers the present huge production of synthetic rubber so essential to the prosecution of the war and to the economy of the nation.

The meeting was presided over by Horace E. Riley, chairman of the North Jersey Section. In his remarks Dr. Riley pointed out that the last 20 years have seen the major growth of the seed planted by Baekeland in 1907. Now this seed has become a tree with some 12 major branches representing the types of synthetic plastics developed; each branch is laden with twigs representing literally thousands of formulations and applications that reach into every phase of our economy. Concurrent with the growth of synthetic plastics as an industry there have been developed new fields of chemistry, those concerned with large polymers, all of which owe much of their vigorous growth to the leaven supplied by this man. He has no doubt that without the impetus of Backeland's pioneering the present-day progress in the development of the synthetic rubbers would have been very much delayed, Dr. Riley said. He then reviewed the achievements of Dr. Gilliland, as mentioned above, which caused him to be selected as worthy of the first Baekeland Award.

In his address Dr. Gilliland first stated that in a period of 2½ years and at a cost of $750,000,000, a synthetic rubber industry was built which is capable of producing more than 1,100,000 long tons of rubber polymer a year and added that this was 60% more than was ever consumed by the prewar rubber industry. He then went on to describe the scope, problems, and progress of the so-called Government Synthetic Rubber Program, which, Dr. Gilliland declared, gave an incorrect impression of the extent to which the government was responsible for it. He said that the major contributions to the program came from a relatively small number of large companies of the petroleum, chemical, and rubber manufacturing industries. These companies, together with a few of the large engineering companies, carried out the engineering design of these plants, and the government supplied only the financial, administrative, and priority assistance. The success of the synthetic rubber program is a real demonstration of the ability of private industry, Dr. Gilliland stated.

The questions of the quality of synthetic rubber, as compared with natural rubber, and the desirability of maintaining a rubber producing industry within our borders were next discussed. It was mentioned that great improvements are being made and at present polymers of the butadiene-styrene type have been developed in the laboratory that have good high-temperature properties. At the present time the synthetic polymers available can replace natural rubber for about 75% of the tonnage required to give products of satisfactory or superior quality. Another 15% of the tonnage can be replaced to give products of usable, but inferior quality, and the remaining 10% of the products require natural rubber. He expressed confidence that synthetic rubber would equal natural rubber in five years.

The competition in the early 1950's will be based on cost considerations, and the cost of butadiene from butylene after the war was estimated at 6½¢ a pound and the cost of GR-S at 15¢ a pound with an adequate profit and return on investment. This should permit the production of from 400,000 to 500,000 long tons of "low-cost" GR-S a year, it was said.

The transition from the present government set-up to one that is self-sustaining will be difficult, but this transfer is necessary if a virile and progressive synthetic rubber industry is to be maintained, the medalist stated. Sale of the plants to private industry offers major problems, particularly as to the basis on which the plants should be sold. It was indicated that a solution would have to be worked out so that in the sale of these plants the best interests of the public were protected while still making it sufficiently attractive for private initiative to develop and improve synthetic rubber.

In making such a transfer, provision should be made to insure that these units either stay in active operation or in standby operation so that a nucleus will be available to meet future emergencies. Active operation, of course, would be more desirable than standby operations since the plants would be improved and kept up to date. However even with no improvements the nation would be assured that an industry was available that could give rubber polymers of satisfactory quality.

Institutes Plastics Program

KENNETH H. CONDIT, dean of the Princeton School of Engineering, Princeton University, Princeton, N. J., has announced that a program of instruction and research in plastics, which will be conducted jointly by the departments of mechanical, chemical and electrical engineering, and the departments of chemistry and physics, will be instituted in the near future. The program will have a two-fold purpose of meeting the growing demand in industry for men equipped with scientific or engineering training supplemented by a comprehensive background in plastics, and of conducting fundamental research in plastics and their application.

Louis F. Rahm, of the department of mechanical engineering, is chairman of the inter-departmental committee charged with the conduct of the program. Other members of this committee are Dean Condit and the chairmen of the other cooperating departments: Hugh S. Taylor, chemistry, dean-designate of the Graduate School; Henry DeW. Smyth, physics; Joseph C. Elgin, chemical engineering; and Clodius H. Willis, electrical engineering.

The program is being developed with the assistance of an advisory committee of 16 industrialists headed by George K. Scribner, Boonton (N. J.) Molding Co. Industrial concerns are also lending support to the enterprise through the donation of equipment for the newly converted plastics laboratory building and by the gift of funds. In addition to Mr. Scribner, other members of the Princeton plastics advisory committee are: E. B. Babcock, Firestone Tire & Rubber Co.; R. V. Beshgetoor, plastics department, Radio Corp. of America; R. M. Burns, Bell Telephone Co.; Allan W. Fritzsche, General Industries Co.; Russel Hopkinson, United States Rubber Co.; Wm. S. Landes, Celanese Celluloid Corp.; Howard F. MacMillin, Hydraulic Press Mfg. Co.; William H. Milton, Jr., plastics divisions, General Electric Co.; R. J. Moore, Bakelite Corp.; Arnold E. Pitcher, plastics department, E. I. du Pont de Nemours & Co., Inc.; Norman A. Shepard, American Cyanamid Co.; Edwin A. Stillman, Watson-Stillman Co.; William J. B. Stokes II, Joseph Stokes Rubber Co.; and Felix N. Williams, plastics division, Monsanto Chemical Co.

Improved Molding Compound

STANCO., INC., New York, N. Y., has developed a new improved Dipex, a molding compound long marketed by the company for use in molding rubber and synthetic rubber goods as well as plastics. For the first time Dipex (improved) may be used in the manufacture of white and light colored articles as this improved product is light in color and leaves no residue on the molded item. Dipex (improved) is said to give clear sharp designs. It is freely soluble in water and may be applied in solution by spraying, brushing, or dipping. It may be used with synthetic, natural, or reclaimed rubber.

Dipex (improved) is for present use in tire molds and in the manufacture of surgical rubber goods which must be white. After wartime restrictions are lifted, it offers broad possibilities for use in the molding of many articles including rubber aprons and sheets, bathtubs for infants, and other infants' articles, children's toys, hot water bottles, bathing caps, milking machine parts, and white wall tires.

Dipex formerly produced by Stanco, Inc., was dark in color, and its use was confined to the molding of dark colored items, including vehicle tires of all types.

Rubber Reserve Co. Circulars Nos. 39 and 40

REFERENCE is made to Paragraph 3 of Circular No. 17 of March 23, 1943, which states that because of the uncertainty of warehouse and producing plant sites from which crude rubber, balata, guayule, synthetic rubber, and latex will be delivered and to establish uniform freight charges to all manufacturers, a 50¢ per 100 pounds net freight charge in carload lots and $1 per 100 pounds in less than carload lots, will be added by Rubber Reserve Co. to selling prices appearing on Exhibit A of Circular 17. For liquid latex, the charges would be determined on the latex dry solids weight. Circular No. 39 states that it is expected that 40,000 tons of the type of rubber which has to be washed and dried before being placed in consumption will be imported in 1945. In cases where rubber is shipped to locations for washing and drying at other than consuming plants, Rubber Reserve in lieu of paying freight to the first destination as Paragraph 3 of Circular No. 17 provides, will allow freight in amounts equaling the cost of shipping the green rubber from the delivery point to the point of consumption, or, the total amount of freight charges which the manufacturer incurs; whichever is the smaller amount.

Circular No. 40 concerns itself with the distribution of GR-M-10. Circular No. 30 stated, in part, that a special grade of GR-M containing an antioxidant was being produced in the government plant at Louisville, Ky. This Circular No. 40 amends part of No. 30: namely, paragraph 3: "GR-M-10 contains a discoloring antioxidant which makes it unsuitable for use in light colored stocks which would be impaired by discoloration. Owing to the similarity in appearance between standard GR-M and GR-M-10 care should be taken by purchasers of GR-M-10 to segregate it for inventory identification purposes."

A May 5 bulletin discusses off-grade GR-M and GR-S plant clean-up material. In the manufacturing process of GR-M, small quantities of the finished material become contaminated with the finer particles of foreign matter, as a result of which it is classified as "Grade A Off-Specification." This material is suited for molded articles although it could not be used for all types of finished products. A certain amount of this material is available from Rubber Reserve Co. at a charge of 20¢ a pound plus the freight charges.

The GR-S copolymer plants accumulate small quantities of plant clean-up material consisting of crumbs dropped on the floor or which have in other ways been diverted from the usual manufacturing process. This material, contaminated with foreign matter and dust, is being screened to remove large foreign matter as soon as straining equipment is available. This plant clean-up will sell at 16.65¢ a pound plus the freight charges. Requests for these materials should be submitted to the War Production Board on Form WPB-2242. Manufacturers desiring up to 200 pounds of either material may obtain purchase permits by addressing requests to the Sales Division, Rubber Reserve Co., 811 Vermont Ave., N.W., Washington 25, D. C.

Northern California Session

A MEETING of the Northern California Rubber Group was held April 26 at the Claremont Hotel in Berkeley, Calif. The technical part of the program consisted of a short talk by W. S. Rea, of United Carbon Co., on the subject of carbon black with special reference to the present expansion program being carried out by the government and the reasons for the present system of control of production and distribution of carbon black by the government agencies in Washington. Mr. Rea emphasized that carbon black production will soon be about four times what it was before the war.

Included in this part of the program was also the reading by Lyn Shafer of questions sent out by the various members of the Group. The answers were read by George Farwell, Russ Kettering, and Don Good.

The meeting began with the introduction of guests. Leonard Boller, a former president of the Group, was present with his partner, Bob Falconer, as was also Mr. Larkin of Standard Rubber Co. of Los Angeles. Besides regular members of the Group from the Pioneer Rubber Mills, Ray Miller, Charles Metzler, and Stan Mason of this company were introduced. A committee consisting of Herman Jordan as chairman, George Petelin and Lud Dimpfl as assistants, George Farwell as treasurer, and E. P. Coxhead in charge of prizes, was appointed to arrange for the summer outing.

Door prizes were awarded as the concluding event of the evening. A wallet donated by Thiokol Corp. was won by Mr. Blackburn and a bottle of beverage donated by Pioneer Rubber was won by Mr. Jordan.

Textile Technologists on Resins

AT THE May meeting of the American Association of Textile Technologists at the Building Trades Club, 2 Park Ave., New York, N. Y., Frederic Dannerth, industrial research chemist, delivered a lecture on "Synthetic Resin Films for Decorative and Protective Purposes." Dr. Dannerth was formerly associated with J. Merritt Matthews, professor of industrial chemistry at the Philadelphia Textile Institute, and was executive vice president of the International Rubber Conference in New York in 1912.

Dr. Dannerth was introduced by Carl Taber, president of the Association, who emphasized the importance of synthetic resins for the manufacturers of textile fabrics. Mr. Taber is manager of the acetate fabric department of E. I. du Pont de Nemours & Co., Inc., in New York. The program also included an exhibit of coated fabrics and free films, and with an attendance of more than 200 this meeting was the largest technical meeting of the year for the Association. The program also included the services of a board of experts consisting of Howard Turner, of du Pont; J. W. McLaughlin, of Bakelite Corp.; Clyde Segner and Wayne Brinckerhoff, of The B. F. Goodrich Chemical Co., and Percy Scherr, of the Velvaray Corp., who in turn discussed the products of their respective companies and answered questions from the audience.

Among the films discussed by Dr. Dannerth were cellophane, cellulose nitrate, cellulose acetate, cellulose acetate-butyrate, and ethyl cellulose. Among the ethylene derivatives, he called attention to polyvinyl

chloride, polyvinyl acetate, and their copolymers, polyvinyl alconol, vinylidene chloride, and polystyrene. After referring to and describing Parlon and Pliofilm, Dr. Dannerth called on Dr. Turner to present the story of nylon films.

Some of the questions answered by Dr. Dannerth and his board of experts were concerned with the resistance of vinyl resins to tropical temperatures, how to provide for adequate ventilation in garments made of resin coated fabrics, how to impregnate paper yarns with flexible resins prior to weaving, can all resins be formed into flexible films, etc.

Chicago Group Hears Shepard

THE last meeting for the 1944-45 season of the Chicago Rubber Group was held at the Morrison Hotel, Chicago, Ill., May 18. Norman Shepard, chemical director for the American Cyanamid Co., spoke on "The Parts Played by Management and by the Technologist in Making Research and Development Work Effective," and William Welch, president of Midwest Rubber Reclaiming Co., presented a sound-color movie recently produced by his company called "The American Way." This film showed in detail the process of making reclaimed rubber and also included pictures taken during the dedication of the company's new laboratory last year. It was accompanied by an interesting talk by Mr. Welch, who discussed briefly some of the developments which have built up the large rubber reclaiming industry in this country.

Dr. Shepard in his paper described how management and the technical men both play a major part in bringing about scientific and technical progress and also discussed some of the flaws of management and the defects of research and development personnel. He tried to show how, with the proper coordination and understanding, if the essential duties of management and research are carried out properly, each may contribute to productive research and profits. Without capital, which management controls and administers, there could be no large research and development laboratories, Dr. Shepard said, but, obviously, the actual technical progress is made by scientifically trained minds, by chemists, physicists, and engineers; and, without these, management and the industries it represents can hope for no major increase in the quality of manufactured products or in the number of new products brought on to the market. The speaker said that in his opinion any company with a large stake in research and development should set up a technical advisory and coordinating committee consisting of the research director, an experienced legal man, a seasoned plant technical man, an engineering department representative, and a man who has broad outside contact as well as a good over-all knowledge of the present activities of the company. The responsibility of this committee should be to keep a constant watch over the research program in a purely advisory capacity.

The annual election of officers for the 1945-46 season was held and resulted in the election of the following men: chairman, James P. Sheridan, N. J. Zinc Sales Co.; vice chairman, Francis S. Frost, Jr., Frost Rubber Works; and secretary-treasurer, W. N. Crumpler, Geo. S. Mepham Corp.

It was announced that a golf outing, to be held at the Hickory Hills Country Club on July 27, would be the next event on the program of the Group. James Adams, of Sears Roebuck & Co., is chairman in charge of arrangements for this affair.

Modern Laboratories Discussed

THE spring meeting of Detroit Rubber & Plastics Group, Inc., was held May 11 at the Detroit-Leland Hotel, Detroit, Mich. A fish dinner was served to 150 members and guests, and, musical entertainment highlighted the dinner period.

Short committee reports were given following dinner. Fred Wehmer, chairman of the educational committee, stated briefly the aims and objectives of the Wayne Educational project, as sponsored by the Group. C. W. Selheimer, of Wayne University, reported on the wartime contribution this project had made in the fields of rubber and plastics. During the years 1942-1945, War Training courses had been given as follows: (a) lecture, (b) first laboratory course, and (c) second laboratory course, all meeting three hours a week for 12 weeks. Total enrollments in these courses were respectively 355, 206, and 85. Training was thus afforded to a large number of people employed in the automotive, aircraft, rubber, plastic, and related industries during this emergency. The final report on this phase of educational activities was made at this time as the ESMWT program officially ends June 30, 1945.

J. W. Temple, chairman of the program committee, then took over and introduced the speakers in the order in which their respective laboratories were established. S. D. Gehman represented the Goodyear Tire & Rubber Co. B. G. Labbe substituted for J. W. Schade, of the Government Laboratory, and J. W. Liska represented the Firestone Tire & Rubber Co. Mr. Schade was prevented from attending because of illness. The central topic was "Three Modern Laboratories and Their Most Interesting Equipment for Evaluating Rubber and Plastics."

It is planned to present these three papers together with some illustrations of the laboratories and some of their most interesting equipment in the July issue of INDIA RUBBER WORLD.

Ontario Section Hears Cramer

A MEETING of the Ontario Rubber Section was held in the University of Toronto, Toronto, Ont., Canada, April 26, and was preceded by dinner at Hart House with 60 members and guests in attendance. The speaker of the evening was H. I. Cramer, director of development, Sharples Chemicals, Inc., who discussed several new products which his company has developed for the rubber industry as well as other industries.

Dr. Cramer stated that the chemistry of the pentanes had been the basis for much of the research work in the organic chemical field carried out by the Sharples organization and pointed out that dichlor pentane was being widely used as a solvent for synthetic rubbers of the butadiene-acrylonitrile type. He said that ultra-accelerators including dithiocarbamates are made in large quantities by Sharples, as are butyl amines used as activators for rubber and in petroleum, resins from alkyl ureas used with textiles and rubbers, and higher molecular weight fatty acid amides used as plasticizers for polyvinyl chloride. He mentioned that Sharples had had extensive experience in manufacturing mercaptans and also referred to its production of alkyl phenols, which are useful with oil soluble resins and as additives for lubricating oils.

The speaker then discussed Vultacs (alkyl phenol sulphides) and showed about 30 slides illustrating the effects of varying proportions of Vultacs in GR-S and butadiene-acrylonitrile-type compounds. The following advantageous properties achieved from the use of Vultacs were emphasized: maintenance of tensile strength and elongation upon extended cure, retention of tensile strength and elongation after severe aging, lower "marching modulus" upon aging, outstanding resistance to heat, and outstanding resistance to flex cracking and tear both before and after aging and at elevated temperatures.

Dr. Cramer stated that the utilization of the Vultacs as primary vulcanizing agents does not minimize heat build-up and set; neither does it tend to improve resilience. These deficiencies can be compensated for, to some degree, by the incorporation of various plasticizers or softeners and by the use of such active accelerators as Methyl Ledate, Ethyl Cumate, or Selenacs in conjunction with acelerators of the mercaptobenzothiazole type. Vultacs show no advantage in Butyl rubber, but they appear to accelerate the cure of neoprene, Dr. Cramer said in conclusion.

Officers of the Ontario Rubber Section elected for the 1945-1946 season at this meeting are: chairman, J. W. Holmes, Jr., Polymer Sales & Service, Ltd.; secretary-treasurer, A. B. Lockley, Goodyear Tire & Rubber Co. of Canada, Ltd.; executive committee, D. F. Walker, Dunlop Tire & Rubber Goods Co., Ltd., C. H. Black, Canada Wire & Cable Co., Ltd., and S. M. Murray, Gutta Percha & Rubber, Ltd.

During the discussion of the proposed amalgamation of the Ontario Rubber Section with the Chemical Institute of Canada, a motion was passed to the effect that the proposal received from the interim board of directors of the Institute be accepted, with the provision that the Ontario Rubber Section continue to function as such.

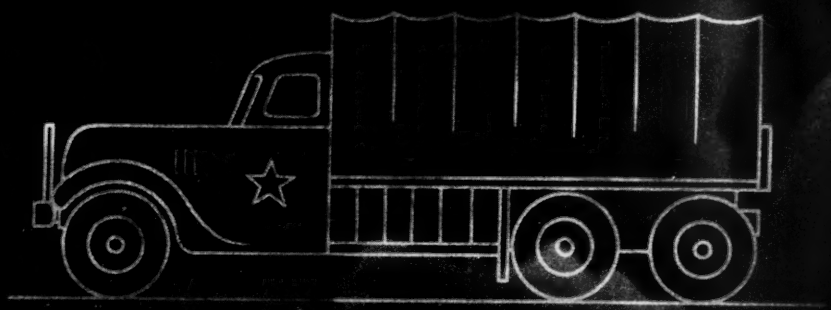
Quiz Program at Montreal

THE final and most successful meeting of the current season of the Rubber and Plastics Division of the Society of Chemical Industry, Montreal Section, was held May 4. The usual dinner at the Ritz-Carlton Hotel preceded the meeting, which was held at the Montreal Technical School and was featured by a Quiz Program. The chairman of the Division, R. V. V. Nicholls, presided, and J. McCreedy acted as master of ceremonies. The board of experts consisted of Norman Burnet and Art Bell for rubber and John Benedito and Ted Booth for plastics, and the program was very well received.

Following the Quiz Program, the principal of the Technical School, Mr. Beaupre, and Mr. Asselin, the plastics instructor, were introduced, and Mr. Beaupre in a short talk presented the history and aims of the school. A demonstration was also given on the use of polarized light for observing stress in plastic parts.

The meeting then formed into small informal groups for trips through the various laboratories of the school and included a demonstration of the use of some of the equipment for plastics working and testing given by some of the pupils. The meeting was concluded with the serving of light refreshments.

STATEX



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UNITED STATES

V-E Day Does Not Change Industry Picture Much; Some Expansion Projects Cancelled

The arrival of V-E Day and the end of the shooting in Europe was the most notable and the most gratefully welcomed event during the month of May, but it has since become evident that victory over Germany will not result in very heavy cutbacks in the military and essential civilian rubber product schedules. Statements by heads of various rubber companies and heads of government agencies concerned with the production of rubber goods, all stressed the need of a continued high level of production and the need of increased emphasis on the conservation of existing products, particularly tires. John L. Collyer, director of rubber programs, on May 8 (official V-E Day) telegraphed management and labor of the tire and tube industry and pointed out the "continued need" of maximum production from existing facilities and the greatest possible speed in obtaining production from new facilities. Again on May 16, Mr. Collyer requested the governors of the 48 states to urge all civilians to "rededicate" themselves to the victory speed limit of 35 miles an hour during the hot summer months.

A. L. Viles, president of The Rubber Manufacturers Association, Inc., on May 24, issued a very complete statement on the continuing civilian tire shortage. The Congressional investigation of the carbon black shortage failed to reveal much new information except an attempt by the government investigators to prove "monopoly" and a "strike of capital" by the carbon black producers. Mr. Collyer also announced on May 15 that all the guayule crop in the United States will be harvested and processed within the next two years because of the acute need of every available pound of natural rubber. The results of a meeting between WPB officials and international officers of the URWA (CIO), held in Washington on May 24 to discuss WPB policy on cancellation of its tire expansion program, was reported from Washington on May 26.

Conservation Stressed as Production Lags

Even before V-E Day a lag in the production rate of essential rubber products, particularly military and essential civilian tires, began to cause some concern, and the necessity of much greater emphasis on conservation of existing rubber products was expressed by Col. J. Monroe Johnson, director of the ODT, W. James Sears, deputy director of the WPB Rubber Bureau, and Mr. Collyer.

Colonel Johnson, on April 27, addressed an appeal to the operators of commercial motor vehicles particularly in which he said: "Practically all available truck tires, especially of the larger sizes, are now on running wheels. The condition of those tires is poor. Many are recaps. The supply available for replacement is sharply limited—the allotments are less than the needs. Summer heat and careless operations will make the approaching months a critical period.

"With little hope for relief in the near future, it is your responsibility as an operator, both in your own interest and to safeguard wartime transportation, to protect your tires, and so assure the continuance of transportation service."

An urgent appeal to users of tractors and farm implements to take care of their tires was issued on April 30 by the Rubber Bureau, with the concurrence of the WFA, the OPA, and the ODT. Explaining why there will be a continuing scarcity of large tires used on tractors and farm implements, Mr. Sears said:

"A large percentage of the equipment and facilities used to produce these tires is the same as those used to make large military truck tires and airplane tires. One of our major problems is to meet the tire demands of the military and also provide the heavy-duty truck and bus tires essential to war production on the home front. . . . Every effort is being made to balance the production of all tires so that an even flow of products and materials will be possible from the farms, the forests, and the mines."

Mr. Sears then asked that users of tractor and farm implement tires see that all tire damage was repaired at once, overloading avoided, tire inflation checked frequently, and tires recapped before the wear is so great that the tire body will not stand recapping.

Colonel Johnson, again on May 2, called on all state governors to stress with their state and local enforcement organizations the importance of controlling highway motor vehicle speeds.

Then on V-E Day, May 8, Mr. Collyer called upon management and labor in the tire and tube industry to maintain their "important contributions" to complete victory. In a message addressed to all company heads, Mr. Collyer said:

"The men and women of your organization have made important contributions toward the attainment of complete victory in Europe. However, there is a big job ahead for the rubber industry and other industries supplying component materials for the manufacture of tires and other essential products. It is therefore appropriate on V-E Day to stress the continued need for maximum tire production from existing facilities. Final requirements indicating the extent of V-E Day adjustments are not yet available, but it is clear that military requirements directly related to the Pacific war, plus minimum tire needs to avoid breakdown of essential civilian transportation far exceed the current estimates of production for many months. This shortage is particularly serious in large truck tires, Groups A-3a and A-3b. As additional information becomes available, you will be informed promptly. We ask that all tire companies and the thousands of workers in the tire industry cooperate to make V-E Day the occasion for renewed effort to increase production in the tire industry."

Mr. Collyer, on May 16, also requested the 48 governors to urge all civilians to "rededicate" themselves to the victory speed limit of 35 miles an hour during the hot summer months. The text of Mr. Collyer's letter to the governors said in part:

"It is a definite fact that there will be no reduction in the over-all production of tires, and certainly there should be no relaxation in the conservation of tires now on the road.

"The tire manufacturing industry and government are working as a team today to supply the military and home front demand for tires. This demand is tremendous —many times prewar needs—more than combined efforts can produce.

"The drivers have done a great job in making their tires give millions of extra miles. I wish it were possible to tell them that we can make enough tires for all and still carry on the war against the Japanese."

"To help attain complete victory as quickly as possible, I have a request to make:

"Rededicate ourselves to the victory speed limit—35 miles per hour during the next four hot weather months.

"Tire wear is 50% more at 50 miles per hour than at 35.

"I appeal to you as governor and through you to the people of your State to do everything you and they can do to extend the life of existing tires."

The RMA and WPB Statements

Mr. Viles on May 24 also made a complete statement on the tire situation, which he said was the result of a very careful check made by his organization with the War Department and all of the government's claimant agencies for tires.

On the basis of information made available to him on all military and essential civilian needs for the second and third quarters of 1945, he said he could "find absolutely no grounds for the rather widespread belief that the civilian driver can have tires for the asking this summer.

"It would take extremely heavy cutbacks to balance production with military and essential civilian needs for the Pacific war," Mr. Viles said. He added that, "No cutbacks of that magnitude have been indicated since Germany's fall."

Estimated tire production for June, July, and August falls 33% short of screened requirements in one of the largest and most critical classes of military and essential civilian truck tires. At the same time the gap between actual production and screened military and essential civilian needs exists today to a greater or lesser extent in every other category of combat tire, it was stated.

"This production lag confronts us with the cold, hard fact that V-E Day has not solved the tire problem," Mr. Viles declared in making a strong appeal for continued conservation during the tire-killing, hot weather months ahead.

Mr. Viles also observed that there has been some misinterpretation of the significance of WPB's release in mid-May of 500,000 more tires for rationing during that month. These 500,000 tires brought the May quota to only 1,500,000 tires as compared with 2,000,000 tires released last December. For the most part, these additional tires represent a carefully built up reserve, set aside to cushion civilian drivers against the impact of hot weather tire destruction, he said. The RMA's best technical estimate is that the May quota must be increased by at least 33% to keep essential civilian cars on the road through June, July, and August. He said that some misconception about the tire picture is apparent, resulting from the V-E Day letdown, partial reconversion in other industries, and the unfounded belief that more gasoline for A-card holders will mean tires in unlimited quantities this summer. It was announced on May 26 that 2,000,000 tires would be allocated for June by the OPA.

Shortages in manpower and component tire materials continue to limit output. The tire plants need 5,350 more workers to reach capacity. Cotton cord and fabric industries need 3,200 more workers at once, rayon cord 789, reclaim rubber plants 450, and chafer fabric manufacturers 250.

"These facts and the WPB order to provide 800,000 passenger tires for new automobiles in the latter part of 1945 at the expense of the tires that would otherwise go for replacement, hold no promise of tires in abundance for civilian motorists this summer," Mr. Viles said in conclusion.

A statement from the WPB on May 26 reported on a conference between WPB Rubber Bureau officials and international officers of the United Rubber Workers of America (CIO), held in Washington on May 24 to discuss the supply, demand, and production facilities situation with special reference to truck and bus tires.

"The necessity for completing Government tire-producing facilities authorized in December 1944 and January 1945 depends entirely on the supply-demand position," it was stated. "It is the policy of the War Production Board to cancel any facilities that are not required to meet military and essential civilian needs."

"The requirements for truck and bus tires, as submitted to the Rubber Bureau since V-E Day, are still substantially higher than estimated production for the third quarter. Revised requirements are expected to be submitted prior to the first of June. If the new requirements are more nearly in line with estimated capacity of the facilities available in the third quarter, some of the new facilities will be cancelled."

It was revealed at the meeting that the Rubber Bureau had already cancelled some tire capacity expansion in the small truck tire-size groups authorized last December and January. Besides the reduction in expansions for small truck-tire size, *there has been a cancellation of every bogie wheel expansion project that was previously authorized.* A quick check of the previously reported bogie wheel projects indicates that cancellations will affect the Goodyear plant at Nashville, Tenn.; the Firestone plant at Pottstown, Pa.; the Goodrich plant at Akron; the Dayton plant at Dayton, O.; and the plant of the Pharis Tire & Rubber Co. at Newark, O. It was stated that these cancellations were possible because of the fact that the Army requirements for bogie wheels have been substantially reduced.

The WPB statement continued to say that in spite of the end of the European war, military requirements for truck and bus tires remain high because of the millions of men still in the European and Mediterranean theaters and the problems involved in the redeployment of them and their equipment. A 5,000- to 10,000-mile pipeline of tires must be filled for Pacific operations and must grow in size as the number of vehicles in use increases.

"At the same time, home-front tire needs are at a very critical stage," it was added. The many demands for tires for essential home-front needs were listed and it was then pointed out that despite the end of active warfare in Europe, the tire needs of both combat and non-combat war theaters and needs of the home-front economy remain large.

"There will come a time, of course, when redeployment of personnel and equipment will have been completed, when victory in the Pacific is in sight, and when military necessities on the home front will have lessened. But that time is not yet," it was emphasized.

CALENDAR

May 14-June 30. Seventh War Loan Drive.

June 4-6. Chemical Institute of Canada. 1945 Conference. Chateau Frontenac Hotel, Quebec, P. Q., Canada.

June 5. Trenton Chemical Society. Kelly's Restaurant, Trenton, N. J.

June 22. Boston Rubber Group. Annual Outing. Woodland Golf Club, Newton, Mass.

July 27 Chicago Rubber Group Golf Outing. Hickory Hills Country Club.

It was agreed at the meeting that one of the handicaps to production is a shortage of manpower. Several possible means of solving this problem and other problems related to tire production were discussed.

Present at the conference were: Sherman H. Dalrymple, president; L. S. Buckmaster, vice president; Charles E. Lanning, secretary-treasurer; G. L. Patterson, general counsel; Tom Ownes, legislative representative, and A. L. Lewis, research director, of the URWA. Representing the WPB were Mr. Collyer; J. E. Trainer, assistant special director of rubber programs; J. L. Cochrun, assistant special director of rubber programs; E. D. Kelly, assistant director of the Rubber Bureau; John S. Johnson, director of the tire and tube division, Rubber Bureau; D. Alan Strachan, deputy vice chairman for labor production; Major R. D. Hetzel, deputy vice chairman for manpower requirements; Alexander Kellenbenz, Labor Relation Branch, Office of Labor Production; and John L. Beckham, acting vice chairman for labor production.

It was also reported that the rate of production in March was the highest ever achieved. It reached a rate of 5,632,000 bus and truck tires for the quarter. By May the quarterly rate of production had fallen to 4,767,000, or a reduction of 15%. The rate has continued to climb from the April low, according to information received from other sources.

Natural Rubber Supply Developments

With Allied forces invading Borneo and with General MacArthur's campaign on Mindanao in the Philippines, the possibility that new sources of supply of natural rubber might soon be available to add to our dwindling stockpile received increasing attention during May. The Goodyear company is, of course, interested in finding out whether the rubber plantation started on Mindanao in 1928 is still intact. This plantation is reported to have a capacity close to two million pounds of rubber per year. Two Goodyear technicians have been loaned to the Rubber Development Corp. to make a survey of rubber properties on Mindanao and to determine what steps are necessary to begin production of rubber in the Philippines as quickly as possible.

With regard to the rubber in Borneo, rubber company officials who know the crude rubber situation in the Far East point out that the Allied forces struck on the east coast of Borneo, which is an oil rather than a rubber region. Rubber is chiefly on the south and west sides of Borneo so that the Allies must gain considerable more land before they can get to the rubber country, it was reported.

In this country Mr. Collyer on May 15 announced that to meet a critical shortage, which makes it necessary to consider natural rubber "in pounds, not tons, from now on," all guayule in the continental United States will be harvested and processed within the next two years. This action was recommended by a special committee, which has just completed a survey. The committee is headed by H. L. Trumbull, of The B. F. Goodrich Co., and includes John McGavack and C. E. Bradley, of the United States Rubber Co., and John Ingle, of the Goodyear Tire & Rubber Co. It is expected that 12,000 long tons of guayule rubber will be obtained. The Rubber Reserve Co. has undertaken the task of processing all existing shrub, and present plans call for two new processing units to be constructed at Bakersfield, Calif., and two other units at Patterson, Calif. The Firestone Tire & Rubber Co. has signed a contract with the Rubber Reserve Co. to construct and operate the mills.

"The program will have the benefit of the extensive work of the Forest Service and other bureaus of the Department of Agriculture," Mr. Collyer stated.

Congressman Poage of Texas, who introduced a bill, H.R. 2347, in the House in February to have a floor of 28¢ a pound placed under the price of guayule rubber to encourage its cultivation and to continue research and experimentation on the production of seed and seedlings, had his bill passed by the House on May 14 and forwarded to the Senate for action. If this bill becomes a law, the Secretary of Agriculture would have the power to enter into contracts with private growers for the production of guayule, but there is a limitation of 40 acres a year as to the shrub on which the floor price of 28¢ a pound would be applicable, and the bill also limits the number of contracts that may be entered into by the Secretary so as to insure that not more than 100,000 acres of guayule shrubs will be harvested during any one year. Some industry comment on this bill indicated that it did not believe guayule rubber could be profitably produced in the United States even with a floor of 28¢ a pound under the price. The cost of the rubber now owned by the government on the 30,000 acres or more included in the Emergency Rubber Project to be harvested by 1947 has been previously estimated to have a final cost about $2 a pound.[1]

The Department of Agriculture on April 27 issued a statement in connection with a Florida Everglades rubber production project which had been advocated recently as a benefit for returning veterans. Rubber specialists in the Department said that rubber production from native plants in southern Florida is not promising at present, and commercial plantings of tropical rubber plants there would not now be justified.

"In Florida it would not now be possible," said the Department, "to compete with tropical areas where conditions are favorable for rapid growth and high yields, and where wage rates are much lower. Until the nation's first-line sources and second-line reserves of rubber are assured, research looking toward domestic production must continue, but unjustified claims or premature developments, such as that suggested for the Florida Everglades, cannot but becloud the issue."

Additional Labor Problems

The labor difficulties in the Akron area particularly, continued during the latter part of April and the first part of May. The

[1] INDIA RUBBER WORLD, Jan., 1944, p. 366.

mill room and rim plant disputes at Goodyear's plants resulted in an unauthorized walkout of 9,000 workers. These difficulties were highlighted by paid advertisements in the *Akron Beacon Journal* by both the company and the Goodyear local URW union. The company statement emphasized that labor's No Strike Pledge had been violated, government authority was being defied, and the contract between the Goodyear company and Local 2 URWA-CIO was becoming meaningless and that a huge volume of rims and tires was being withheld from the men of our Armed Forces who desperately need these products in their struggle with the enemy. It added that the Goodyear management does not believe this situation represents the will or wishes of a vast majority of the company's employes.

It was also stated that there had been other stoppages during the month of April where established contract procedures were flagrantly ignored. In each instance vital war production was hampered, and no action of a disciplinary nature was taken or recommended by the union to compel observance of the contract terms.

The statement went on to say that this situation very clearly contradicts the accepted principles of collective bargaining and serves to discredit the integrity of the union as a part to the existing contract between the union and the company. The impossibility of operating a vital industry under such chaotic conditions should be obvious to any fair-minded person.

"We believe the great majority of Goodyear employes are fair minded, and we earnestly urge them to take corrective action," the statement concluded.

The statement of Goodyear Local No. 2, URWA-CIO, which appeared on May 1, started off by saying that the officers of Local No. 2 are also deeply concerned over the conditions at present existent in the Akron plants of the Goodyear company and deeply deplored the number of manhours lost in the past months, but the union did not accept the company's inference that the union alone was the one responsible for this deplorable condition. The union then said that the accepted meaning of the agreement between the company and the union was being subjected to entirely new interpretations, and negotiated agreements were being completely disregarded by the company. The union statement continued with several specific instances in which it accused Goodyear of not living up to the terms of agreements in force and concluded with an assertion that the officers of the local union had exerted every effort in the retention of peaceful and properly responsible relations.

"The company has forced the issue," it was said, "the membership has spoken, as officers we are theirs to command, and our actions shall now as always be governed by the dictates of the majority."

The two issues were settled on May 1, one by an agreement signed between the Goodyear Local 2 and the company, in which it was stated that the seven-inch rims would be withdrawn from production on Line 3 at the rim plant, and the position of the welding machine in the rim plant would be moved to the position desired by the workers. The WLB, through an arbitration panel, awarded Plant 2 pit curing men 70¢ a hundred tires cured, an increase from 60.2¢ a hundred tires previously paid.

The WLB, the NLRB, the Department of Labor, and other interested parties were also informed on May 1 of the decision of the Goodyear Local 2 to take a strike vote under the terms of the Smith-Connally Act, by C. V. Wheeler, the local president. It was announced later in the month that this vote would be taken on May 28.

On May 21, President Truman ordered the Army Quartermaster Corps to take over and operate the Cocker Machine & Foundry Co., Gastonia, N. C., because a strike in the plant was restricting production of textile machinery used in the manufacture of tire materials. This walkout strike followed disputes in the negotiation of a contract between the Cocker company and two AFL unions—The International Moulders & Foundry Workers and the International Association of Machinists.

Synthetic Safety Record Cited

S. T. Crossland, executive vice president of Rubber Reserve, delivered the keynote address at the company's Safety and Fire Conference held in St. Louis on May 16. He revealed the following injury indices as reported by the National Safety Council for the government synthetic rubber plants in comparison with plants of the petroleum, chemical, and rubber industries for 1944:

Industry	Frequency	Severity
Petroleum	12.87	1.30
Chemical	10.07	1.12
Rubber	11.14	0.76
Government synthetic rubber plants	8.20	0.58

Two of the factors contributing to the setting of this praiseworthy record in safety were: (1) the modern dispensary facilities installed and so well used by the employes that infection and injury severity have been kept at a minimum, and (2) the placement of employes on duties to which they were physically adapted, Mr. Crossland said. He emphasized that in these abnormal times, when we are supplying the nation with a product essential to the winning of a war, accident prevention becomes more than a mere humane, efficient, and economic practice. Accident prevention actually becomes equivalent to an increase in production facilities.

In the course of his talk Mr. Crossland said that between June, 1942, and May 1, 1945, the amount of synthetic rubber produced for the account of Rubber Reserve in government-owned facilities totaled 1,211,125 tons. Of that amount 3,599 tons were produced in 1942; 207,864 tons in 1943; and 737,092 tons in 1944. In the first four months of this year the production totaled 296,045 long tons.

Many reasons were given for believing that there would be a continuing increase in rubber consumption for several years during the postwar period, and it was indicated that it was generally conceded as necessary for the synthetic plants in this country to continue in production at their highest rate of capacity for several years after the liberation of the lands in which rubber grows.

Mr. Crossland said that upon the basis of considerable information now available, it is believed that German synthetic rubber is of a different type from, and in many respects inferior in quality to, American synthetic rubber. A particular deficiency of German synthetic rubber is in its processing characteristics, but notwithstanding the probability of the general superiority of American synthetic rubber, we hope to obtain additional information about the German product which might be of value in solving some of our particular problems. Already an extensive study has been started on certain chemicals used by the Germans which may be a benefit to our programs.

Mr. Crossland paid tribute to the ingenuity, skill, and technical and managerial ability of the companies participating in the government synthetic rubber program. The results strongly reaffirm the reliance placed upon such companies to do the job which had to be done, he said in conclusion.

The Carbon Black Investigation

The Mead Committee began its public hearings in Washington on May 4 of the causes of the shortage of carbon black which caused some reduction in the production of military tires during March and has resulted in a compulsory reduction in the amount of carbon black that may be used in many other essential rubber products. Some of the facts reported include an admission by D. P. Morgan, head of the WPB Chemicals Bureau, that he and the Bureau were to a considerable extent to blame for the shortage, that the WPB had never placed carbon black on the "critical materials" list, which fact resulted in the shipment of large amounts to Spain and Argentina when it was urgently needed for our own war effort, and that former Rubber Director Bradley Dewey had asked for an additional 100,000,000 pounds yearly of channel carbon black in June, 1944. Under a compromise agreement the ORD settled for 50,000,000 pounds of channel black and 50,000,000 of furnace black.

E. B. Babcock, of the Firestone company and former Assistant Rubber Director, was reported as having said that the WPB Chemicals Bureau "found it very difficult" to accept the estimates of the Office of the Rubber Director regarding future carbon black needs for the expanding tire program. He said that reduction in carbon black content of tire treads—ordered as a conservation measure—had resulted in tires of poorer wearing qualities. This, Mr. Babcock said, would tend to shake the public's faith in synthetic tires to a greater extent than was justified.

Colonel Dewey in his appearance before the Committee on May 14 said that when he resigned as Rubber Director last September, plans had been made to assure a sufficient supply of carbon black, but those in the WPB responsible for carrying out these plans did not do so. In another statement following his appearance before the committee Colonel Dewey was reported as saying that tire production workers in Akron and elsewhere had a right to be bitter about the fact that the carbon black shortage interrupted the 120-day non-stop tire production program.

Carbon black industry officials denied implication that the industry was a monopoly and that it had purposely restricted production expansion. As mentioned in this column in our April issue, the refusal of the OPA to grant an increase in the price of channel black manufactured from high priced gas was a major factor in delaying the expansion of channel black production facilities.

United States Department of Commerce, Office of Surplus Property, Washington, D. C., announced that sales of consumer goods during April totaled $4,889,784.02, the reported cost of which was $13,930,142.70. Included in these sales were 15,560 yards of neoprene fabric to Belvedere Fabrics, Inc., New York, N. Y., for $7,974; 12,916,125 pounds of hydraulic packing to United States Rubber Co., Passaic N. J., for $7,992; 50,000 pounds of elastic head harness to Hirsch Mercantile Co., Los Angeles, Calif., for $21,100; and 50,000 pounds of elastic webbing to Post Distributors, Inc., New York, for $40,250.

WPB Announcements

Amendment 6 to R-1 further limits inventories of reclaimed rubber by reducing inventories permitted to users from 90 to 45 days' supply. Sixty days supply is now the maximum allowed for aqueous dispersions of reclaimed rubber; previously these had not been under inventory control. Holders having stocks in excess of these limits may ask the assistance of the Rubber Bureau in their disposal.

Permitted inventories of natural rubber, natural latex, and all types of synthetic rubber are continued at the 60-day level. Inventories of chlorinated rubber remain at 30 days.

Companies engaged in making reclaimed rubber or aqueous dispersions of reclaimed rubber may maintain inventories of scrap and all products of their own manufacture in any amounts deemed advisable. The same holds true for synthetic rubbers manufactured by the company itself.

Amendment 1 to Limitation Order L-345, as Amended April 24, 1945, places production of camelback for civilian use under specific authorization by WPB. L-345, which became effective March 16, reduced considerably the production of camelback for civilian use for the period ending June 30, 1945. The purpose of the original order was to conserve carbon black so that more of this component would be available for the production of urgently needed heavy-duty military and essential civilian tires. Under Amendment 1 specific authorizations will be issued so that the maximum amount of camelback allowed for civilian recapping will be permitted from a total of 90,000,000 pounds now scheduled for manufacture in the second quarter of 1945, WPB said.

The Rubber Accelerator and Antioxidant Industry Advisory Committee held its first meeting in Washington on May 9, with L. A. Schlueter, of WPB's Chemicals Bureau, the government presiding officer. The committee's recommendations will be coordinated with the programs of the Rubber Bureau and Rubber Reserve Co.

Assistance in obtaining rubber, lumber, and other materials for the production of toys and games, as well as fiberboard shipping containers to facilitate maintenance of employment through speedy resumption of civilian production whenever military contracts are cut back, was requested by members of the Toy and Game Industry Advisory Committees at their recent joint session, WPB reported April 27. Committee members volunteered to submit to WPB estimates of the industries' future needs with respect to materials and containers.

Limitation Order L-39, issued February 24, 1942, to control production and distribution of fire protective, signal, and alarm equipment, has been revoked, but other controls affecting the use and acquisition of materials for production of this equipment continue in effect, WPB announced May 17.

Producers requesting allocations of phosphate and phthalate plasticizers for insulations must, according to Schedules 61 and 63, M-300, as amended May 2, specify the type of wire for which the material is needed.

Schedule 87 (Phenolic Resin and Phenolic Resin Molding Compound) to M-300, as amended April 30, tightens restrictions on all resins containing para-tertiary butyl phenol and para-tertiary amyl phenol and places under control resorcinol resins.

Nylon for Tires

As a result of the vital importance of nylon in the manufacture of airplane tires, Army requirements have caused many new rules to be written into the laws governing critical area WMC boards supplying workers for the textile industry. Tire cord and duck yarn will continue to be manufactured as long as necessary to receive first call on manpower and materials. It is expected that more than ten million pounds of nylon for tire cord will be used this year.

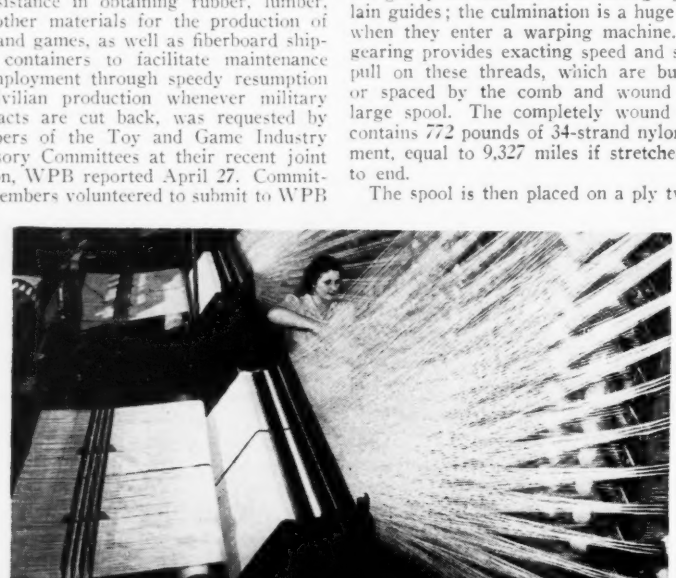
Laboratory test results have shown that nylon cord is more than 225% stronger than cotton and 137% stronger than rayon, and tires made with nylon cord will take more abuse, while the plane is landing, than any other tire made.

Nylon, for tire cord, goes through many processing operations before it can be practically used for tires. In an air treated room where humidity is maintained between 70 and 75%, the hair-like filaments, which are shipped in 2½ pound cones, are placed on spindles of 1,216-spool creel banks, and the glossy threads are lead through porcelain guides; the culmination is a huge comb when they enter a warping machine. The gearing provides exacting speed and steady pull on these threads, which are bunched or spaced by the comb and wound on a large spool. The completely wound spool contains 772 pounds of 34-strand nylon filament, equal to 9,327 miles if stretched end to end.

The spool is then placed on a ply twister where four threads of 34 filaments each are wound on smaller spools. These spools are placed on respooling machines where the nylon is wound on larger spools and then placed on a cable twisting machine. At the conclusion of operations, the original 34-filament thread has been increased to 272 filaments and is now ready to be woven. This enlargement of strands has increased the original tensile strength of 3¼ pounds a strand to 27 pounds a cord.

After processing, the spools are placed in a creel bank behind an automatic loom and are then fed through the loom where they are woven into a nylon tire fabric.

From further experimentation in the laboratories of United States Rubber Co. it has been indicated that the use of nylon in literally hundreds of postwar products will be an actuality.



United States Rubber Co.

Nylon Containing 272 Filaments Entering Cord Loom and Weaver

New Army Footwear

The Army Quartermaster Corps recently announced two types of footwear it has developed.

The former cloth-top overshoe, previously used by the Army and now designated as "limited standard," has been replaced by a new all-rubber arctic overshoe since synthetic rubber is now more generally available, and it is thus no longer necessary to continue the cloth model, which had been used as a conservation measure. The new overshoe, more waterproof, easier to clean, and more durable, is made over a new standard Army last. The arctic is fastened with five buckles instead of four as in the former shoe because of the greater height of the new footwear, 13½ inches. Manufacture and procurement of this item is expected to begin in March.

Designed for cold, damp climates is a knee-length boot developed to replace the standard overshoe under some combat area conditions. The new boot, incorporating many novel features, is lighter than the calf-length overshoe despite its greater length. Affording more protection than its predecessor, the wader-type boot is flexible enough to permit its being conveniently wrapped. The overshoe, fastened above the knee by an adjustable buckle and below the knee by snap fasteners, provides greater protection and comfort to the wearer. The foot, made over the regular overshoe last, is equipped with four pairs of eyelets and leather laces to insure a better fit. The leg, which extends well over the knee, is fashioned of lightweight olive drab rubber-coated fabric.

Tire Repair Company in Italy

What is believed the largest tire repair shop overseas is being operated by an Ordnance tire repair company in Italy. Commanded by Capt. M. L. Shreves, this outfit turns out during an average 30-day operating period an average of 534 tires daily, some of which receive three separate repair operations. In 24 actual operating days 12,806 tires were completed. One repaired tire rolls off the assembly line every 2¼ minutes of operating time. The company personnel consists of five officers and 140 enlisted men. About 145 Italian civilians and 60 Italian soldiers are employed each day. Most of the Italian civilians were originally local farmers. It requires about a fortnight to train an unskilled civilian for repair work.

Many trucks used for transporting supplies to the Italian front are now on recapped tires. Many low-lift machines, used in unloading ships and placing items in

depots, were deadlined for lack of tires until the company started repairing the size required. Road-grading machines depend entirely on repaired tires.

The following figures are from the operation records of the company during a 30-day month, with 24 actual operating days:

Tires completed	12,806
Tubes repaired	9,984
Tires inspected and classified	30,673
Tires shipped	60,186

The tire shop was opened at its present location on July 7, 1944. Floor space under roof was 15,960 square feet. The first repaired tire was finished on July 7. This tire, retained by the company, is called the "Two-Million Dollar Tire" for it is estimated that the cost of the machinery, the training of the personnel, and the cost of moving personnel and machinery would amount to practically that figure. Besides this, 156 additional tires were repaired on that first day, while waiting to be repaired were approximately 65,000 tires of all sizes.

During July, 5,154 tires were completed. The shop was being run on a 24-hour schedule, and production was increasing as the Italians began to learn their duties more thoroughly. In August, output rose to 11,190 tires completed, many of which required three separate repair operations, such as spot, section, or reenforcement repairs, before a full recap could be applied. It is estimated that if each tire required only one repair operation, the shop could turn out 1,200 tires a day. In September the shop operated only seven days owing to lack of material. During this period of waiting the company took over the operation of the compound where tires waiting to be repaired are stored and found 105,119 tires there. Materials arrived during the first days of October, and production was resumed October 4. Nine thousand tires were repaired in the remaining days of the month.

Production since that time has been uninterrupted. Production data for the period July 7 to December 14 reveal that 48,769 tires were completed, requiring more than 80,000 operations, and that 6,474 units were retreaded.

War Department Film "Rolling to the Rhine"

The War Department's Motion Picture Branch, Industrial Services Division, has just released a 10-minute sound motion-picture entitled "Rolling to the Rhine" that tells the story of the "Battle of Supplies" in which the products of the truck and tire manufacturing industries contributed so much to the success of the European war. The picture emphasizes the important role men and trucks and tires performed in delivering every front-line need. More than 90% of the footage has been actually filmed in combat areas during our lightning thrust in the Rhine region.

The film is useful for showing to both labor and management as another means of stimulating greater tire production. It is available in both 16- and 35-millimeter sizes, and film distributers have been set up in the key trucking and tire manufacturing areas of the country. For address of your nearest film distributer write to Chief, Motion Picture Branch, Industrial Services Division, Bureau of Public Relations, Pentagon, Washington 25, D. C., or contact the industrial services officer in your Service Command.

Dustproof Goggles Developed

After intensive research carried out in collaboration with the armored Medical Research Laboratory at Fort Knox, Ky., the Quartermaster Corps has developed virtually dustproof goggles. A single piece of shatterproof plastic lens is made flush; so the person wearing them can clean them with a single swipe of his sleeve. An envelope containing extra lenses is provided, and the frame permits rapid interchangeability of lenses in order to utilize the special green polaroid lens designed to prevent glare.

Composed of an oil-resistant synthetic rubber, free from skin irritants, which molds the frame to face contours and keeps dust out, the elastic headband is attached to grommets in T-slots punched in the lens to prevent buckling. The frame, which rests on the cheek bones and fits snugly on the bridge of the nose, permits ventilation through small holes around its edge and has a dark finish for camouflage purposes.

The goggles are quickly removed by means of a quick release buckle on the head band.

A "dust box" and a field of vision device were two of the experimental devices used to develop these goggles which have the widest range of vision of any other goggles previously tested.

U. S. Army Photo

New Army Dustproof Goggles

EASTERN AND SOUTHERN

Hewitt in Mexico

Hewitt Rubber Corp., Buffalo, N. Y., has entered into a working agreement with Fabrica de Artefactos de Hule Eureka, S. A., manufacturer of mechanical rubber products. Hewitt will supply mechanical equipment and technical "know-how" to increase the output of the Mexico City company. In consideration of this assistance Hewitt acquires a preferred stock interest in Eureka, plus annual service fees. The agreement provides that key men and departmental heads of Hewitt will, from time to time, visit Mexico to train Eureka technicians in modern methods of manufacture—methods suitable to conditions in Mexico. Also Eureka will send men to Buffalo for first-hand study and analysis of U. S. manufacturing operations.

Charles Paeplow, Hewitt engineer, who recently spent several weeks at the Eureka plant, now is specifying what equipment is needed and is organizing a new system for the flow of materials.

Manuel Escandon, general manager of Eureka, has been in Buffalo since the middle of April, studying manufacturing methods and departmental organization at the Hewitt plants.

Michael Berman, Hewitt manager of research and development, is in Mexico City now to analyze Eureka's chemical problems and to familiarize its personnel with U. S. methods of making many types of rubber compounds. When Mr. Berman returns to Buffalo, he will send two Hewitt chemists down to carry out the program of chemical compounding.

The Eureka company is 25 years old. Its products include rubber heels and boots, rubber matting and packings, rolls for printing presses, many types of industrial hose, transmission and conveyer belts, a diversified line of druggists sundries, and molded rubber items for industry. Occupied area of the plant totals 74,000 square feet. The average employment is 600. Current production is running about 750 tons (raw rubber stock) per year.

Mr. Escandon said the company is willing to spend $500,000 to modernize its plant. Eureka recently bought some vacant property adjacent to the plant, and this provides 47,000 additional square feet of floor area for new buildings.

Immediate goal of the tie-up with Hewitt is to raise Eureka's production to 2,000 tons in 1946 and to 4,000 tons a year by 1948. This figure represents about five times the current output. This increase is warranted by the higher purchasing power expected to accompany the increased industrialization in Mexico.

The plan calls for Eureka to build products labeled with the brand "Eureka-Hewitt." Quality standards of all products will be under Hewitt control.

Personnel Advanced

Hewitt recently announced that Joseph H. Hayden has been promoted to the position of vice president and William H. Watkins has been named controller and assistant treasurer.

Mr. Hayden, with Hewitt 27 years, is also chairman of the Mechanical Division of the RMA and is a member of the rubber industry's committee to both the WPB and OPA and in 1942 served as a consultant to the WPB in Washington. Born and educated in Chicago, Mr. Hayden joined Hewitt immediately after service in the first World War. He became manager of the company's New York office in 1925, later returned to the Buffalo headquarters, and was named secretary of the corporation in 1936. In assuming his new position he retains the title and duties of secretary.

Mr. Watkins this year completes his twentieth year with Hewitt. A native of Buffalo, he began his business career as a cost accountant with a local chemical firm. At Hewitt he has served as a cost specialist and has engaged in market research and analysis. He is one of the founders of the Buffalo Chapter, Controllers Institute of America. Until his recent promotion he was head of the Hewitt accounting department.

American Viscose Corp., 350 Fifth Ave., New York, N. Y., on May 7 held its annual stockholders' meeting in Wilmington, Del., at which President Wm. C. Appleton reported that operations for the first quarter this year continued at a high rate of production, with net sales for the period at $29,718,944, 8% above the figure for the '44 quarter. Construction of the additional facilities at the Front Royal, Va., plant to increase annual output of rayon tire yarn to 82,000,000 pounds is nearly complete. Plans have also been developed for a 75% increase in capacity at the Meadville, Pa., plant making acetate rayon yarn and staple fiber.

Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh, Pa., has appointed J. H. Henshaw, general export manager. Starting with the company in 1931, Mr. Henshaw went to the Newark branch in 1932, became paint manager at Birmingham in 1938, and a year later became assistant manager of the Boston unit. Mr. Henshaw's staff includes C. H. Tilp, Pittsburgh office, in charge of glass export; W. J. Werner, Newark plant, in charge of paint export; and J. Rivera, Baltimore brush division, in charge of brushes.

The Baldwin Locomotive Works, Philadelphia 42, Pa., has formed a Canadian subsidiary, Baldwin Locomotive Works of Canada, Ltd., to market in the Dominion such Baldwin products as turbines, water wheels, hydraulic presses, power tools, and Diesel engines from headquarters to be opened soon in Toronto. Officers of the new company, elected at an organization meeting in Toronto, are Ralph Kelly, president; W. Horace Holcomb, vice president; W. N. Brownlie, managing director; H. D. Humphreys, secretary and treasurer; and T. E. McFalls, assistant secretary and assistant treasurer. All except Mr. Brownlie are officers of the parent company in Philadelphia.

The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y., has added to its public relations staff Charles C. Miller, a graduate of Oberlin in 1931, former city editor of the Conneaut, O., *News Herald*, city editor of the *Akron Beacon Journal*, and Knight Newspapers Washington correspondent. In 1943, Mr. Miller visited Haiti, the Amazon Valley, and Bolivia as a member of a press tour arranged by the Rubber Development Corp., and he reported on rubber production in Central and South America. Mr. Miller is a member of the National Press Club and the White House Correspondents Association.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., on April 30 announced completion of a new unit at the du Pont-operated neoprene plant at Louisville, Ky. The expanded facilities will step up production by approximately 26% to an annual volume of 60,000 tons. The new addition, constructed and equipped at a cost of $7,000,000, is the fifth in a series of units which have been rushed to completion, one by one, to meet a rapidly increasing demand for neoprene. More than 2,000 men and women are working at the plant, which from the standpoint of number of employes is the largest of all the government-owned synthetic rubber plants. They work on shifts to keep the neoprene flowing to the shipping platforms 24 hours a day.

Durez Resin for Hard Rubber Compounds

A thermosetting phenolic resin, identified as Durez 12687, is applicable to the softening of synthetic rubber in the milling and processing stages of semi-hard and hard rubber compounds. In contrast to natural rubber, synthetic rubber is stiff during such processing, and, therefore, one difficulty has been the addition of sufficient loading during milling to produce these hard and semi-hard rubber stocks. When natural rubber was available for production of these stocks, it was no problem to load with a reenforcing material such as carbon black because of the natural plasticity of the rubber on the mill. The thermosetting resin reenforces rubber in the same manner as carbon black and is especially suited to synthetic rubber for this purpose. Producing stocks of high tensile strength, a high degree of hardness, good ductility, low temperature flexibility, and depending upon the amount of resin used, the amount of reenforcing agents normally required for definite hardnesses can either be eliminated or reduced proportionately.

A vulcanizate having a hardness of 92, tensile strength of 2,600, an elongation of 300%, and passing the A.S.M.T. freeze test without breaking, can be produced from a Buna N stock having 50 parts of Durez resin on 100 parts of rubber, and a normal sulphur and accelerator content.

The softness and hardness is dependent on, respectively, the amount of resin and carbon black added to the compound on the mill. The resin is unaffected by oxygen, and the logical assumption is that it will serve as an antioxidizing agent.

Such semi-hard rubber stocks can be made from synthetic rubber, and, since this same resin is compatible with natural rubber, the future possibilities are said to be limitless. Durez Plastics & Chemicals, Inc.

U. S. Rubber Developments

United States Rubber Co., 1230 Sixth Ave., New York 20, N. Y., has announced that a new type of cushion support for latex cushioning material will be available in the postwar period. The design will incorporate the leaf spring principle. Construction simplification, assembly, and installation, space saving, and greater seating comfort are some of the advantages. The conventional coil springs are eliminated; instead, a leaf steel spring and a flexible surface of a diaphragm are combined. These cushions are quickly cemented to the cushion carrier, which is part of the seat frame itself. Upholstery can be either sewed or cemented on, thus eliminating tacks.

U. S. Rubber has developed a specially compounded synthetic rubber for the purpose of protecting high-speed helicopter rotor blades from the abrasive effects of sand and rain. This synthetic rubber strip 18 feet long is cemented to the leading edge of each blade, and with this protection machines have been flown many hours without damage to the blades. Previously the fabric covering on the blades had started coming off after 10 minutes.

E. G. Brown, manager of U. S. Rubber's mechanical goods division, has announced that a new form of synthetic rubber is being used to seal brass shell cases to steel projectiles in manufacturing 40 mm. ammunition. The rubber takes the form of crimping rings in hydraulic presses which seal the shells under heavy pressure. The rubber "flows" into irregularities when placed between the shell and a steel die, thereby sealing the projectile. When pressure is released, the rubber returns to its original shape. The rings must, of necessity, withstand severe flexing and pressures up to 60,000 pounds per square inch.

The premiere program of "Serving Through Science," new television series to be sponsored by U. S. Rubber, was presented over DuMont television station WABD at 8:00 p.m., May 6. The initial show of the series was predicated on the theme, "Rubber Goes to War." Among demonstrations shown for the first time on television were operation of a self-inflating life raft and a self-sealing fuel cell.

U. S. Rubber has produced 36 million rubber heels for the Armed Forces since Pearl Harbor, according to A. C. Grimley, sales manager of the company's sole and heel department. He also revealed that company chemists had developed a satisfactory tan heel for tan shoes from synthetic rubber, which is now in production. Since the start of the war all heels have been black in color.

Charles J. Stift has been named district manager at Baltimore for the Fisk tire division. Joining the company at Chicago, Mr. Stift brings some 20 years' experience to his new post and has successively been a tire salesman, then manager, specializing in merchandising premium tires, and later Fisk merchandising representative under the Baltimore branch for western Pennsylvania, eastern Ohio, West Virginia, and part of Maryland. He also served as coordinator in bullet-sealing fuel production at Detroit. In this new post Mr. Stift succeeds D. R. Kinsel, who has been advanced to more important duties.

Pennsylvania Rubber Co., Jeannette, Pa., signalizing observance of National Tennis Week (May 27-June 3), last month in Los Angeles, Calif., awarded to Miss Pauline Betz, national women's singles champion, a plaque containing the 50-millionth tennis ball made by the company. A. I. Peck, Pennsylvania's Pacific Coast manager, participated in the ceremony. Pennsylvania Rubber made its first tennis ball in 1909 and its millionth before World War I. When supplies of natural rubber were cut off after Pearl Harbor, the company developed a fairly satisfactory tennis ball using reclaimed rubber. In August, 1943, however, the company went into mass production of synthetic rubber tennis balls said to be as good as those of natural rubber. Pennsylvania Rubber has modernized and largely increased its tennis ball factory facilities at Jeannette during the war and has greatly intensified its research laboratory activities for improvement of the product.

Wilmington Chemical Corp., 10 E. 40th St., New York, N. Y., has appointed Paul J. Pauls, Inc., Union Bldg., Plainfield, N. J., export distributer for Wilchem rubber chemicals. The export firm, which was recently reorganized, specializes in chemicals for the rubber, plastics, and protective coating industries. P. J. Pauls, who has operated in the export field for more than 20 years, continues as president. Dagfinn G. Thuesen, actively engaged in various phases of the American chemical industry during the past two decades, has been named vice president and technical director of the export company.

OHIO

Goodyear Appointments

Fred W. Climer, assistant to the president of The Goodyear Tire & Rubber Co., Akron, has been chosen by President Truman as an alternate member of the National War Labor Board, representing employers. Mr. Climer will spend every other week in Washington. For the past three years he has been active on a part-time basis in the wartime service of the government. In October, 1942, he was appointed assistant chief of a section of WPB to plan and direct the installation of labor-management committees in the industry. In February, 1943, Mr. Climer accepted an appointment in the regional WLB office in Cleveland, serving there one week each month until mid-1944 when he was named a substitute of the WLB in Washington.

C. M. Van Epps, sales manager of the Arizona division of Goodyear Aircraft Corp. at Litchfield Park since June, 1944, has been appointed assistant general sales manager of Goodyear-Australia. With the company since his graduation from Kenyon college in 1926, Mr. Van Epps served in the sales organization of The Goodyear Tire & Rubber Co. in Baltimore and Philadelphia districts and in Akron on sales analysis work. He had also been assistant store manager for the company at Philadelphia, St. Louis, and Oklahoma City and in 1941 was made district store supervisor at Kansas City. His transfer to Goodyear Aircraft, Akron, followed in 1942, and he was assigned to the sales contact engineer division as Washington, D. C., representative.

E. J. Thomas, Goodyear president, has been appointed a director and regional vice president of the National Association of Manufacturers for the Midwest area during 1945.

Goodyear executives are watching with interest MacArthur's drive to Mindanao, to learn if the rubber plantation started there in 1928 is still intact. This plantation is small—2,500 acres is the limit allowed by Filipino law—but it is one of the highest yielding per acre properties in the world. The plantation, if it has been retaken, will give America its first Philippine rubber since the Japs swung through that territory in the Spring of 1942. The plantation has a capacity of nearly two million pounds of rubber a year. Since a quarter of a million trees are involved, and the rainfall is heavy in that sector, destruction of these trees by the Japs would have been difficult. Thus, Goodyear officials believe that the greater part of the trees are still standing.

J. J. Blandin, manager of Goodyear's crude rubber division, revealed that in addition to the Pathfinder estate, the company has been asked to help rehabilitate two other plantations on Basilan Island, just off the Zamboanga Peninsula. This work is being done so that crude rubber can be shipped to the United States as quickly as possible. The Island of Mindanao is capable of producing a considerable quantity of rubber, but since labor is scarce and wages are comparatively high, the best system of producing in this locality would probably be through small native plantings under government supervision.

P. W. Litchfield, Goodyear's chairman, emphasized great strides in rubber applications in the nation's postwar economy, according to a recent article in the *Lee Traveler*, a servicemen's paper. The great demands for synthetic and crude rubber will be met. In the 1950 decade the automotive, aviation, construction, road building, and agricultural industries will use a great deal of rubber and plastics in their various forms and applications. The period immediately following the war's successful conclusion, however, will be marked by a great civilian demand for tires and tubes. Intensive mechanization of equipment in the industries previously mentioned would result in an increase in the use of pneumatic tires for tractors, farm implements, and construction machinery. Mr. Litchfield's estimated proposed production as follows: foamed latex, a jump from 8,000 to 27,000 long tons, and rubber films and plastics, from 5,000 to 35,000 long tons; shock absorbers, 10,000 long tons; and rubber spring suspensions, 15,000 long tons of crude or synthetic.

OPA has announced that there will be only a limited supply of new tires available for car owners. C. W. Sanderson, manager of the product analysis division of the Goodyear company, stated that common-sense driving would go a long way in prolonging the life of the tires now in use. Driving tests showed that the amount of synthetic rubber used up in driving a car 20,000 miles at 35 miles per hour is 35.7 pounds. When a car is driven at the rate of 50 miles an hour, 61 pounds of rubber are used. Thus, it was emphasized that the slower the driving, the greater the life of the tire.

Improved Products Developed

A. F. Landefeld, manager of Goodyear's Pliofilm department, has announced an unusual flame-resisting plastic-derived fabric, Vitafilm, which is easily cleaned through use of a damp cloth. Potential uses include luggage, ladies' hand bags, auto seat covers, wall coverings, tapestries, doilies, footwear uppers, ladies hats, and other costume accessories. The Vitafilm is supplied in film form in strips slightly less than one inch wide. The fabric is said to resist oil, acids, greases, water, sunlight, and fading. It will be produced in volume after the war, although a limited supply is now available.

"Compass 250," a new transmission belt which utilizes steel cables instead of cord or fabric for the carcass, was announced by Goodyear last month. W. C. Winings, manager of the mechanical goods division, and Walter P. Hallstein, Jr., belt department, said that this transmission belt was especially suited for postwar machinery and equipment. Patented by Goodyear years ago, a belt construction utilizes an envelope of non-load carrying fabric in which the steel cables are encased; the cables consist of a special twisted, finely stranded, high tensile wire. Half the cables in a belt are twisted to the right and half to the left to insure a neutralized, true running belt.

Because of the rubber bed and the fabric envelope, the belts are said to be "practically unbreakable." Although the belt costs more per inch of belt width than conventional types, it has the advantage of a correspondingly narrower belt for specific power loads. The belt can be adapted to lower belt speed ranges and is stretchless and shrinkless, being adapted to high speed drives, thus enabling it to accept the tension developed by centrifugal force and still maintain a high tension capacity for load carrying. Almost complete elimination of "creep" on the pulleys is eliminated, to result in power savings, speed regulation improvements, and a marked reduction in pulley face and belt face wear. The belts will be produced in practically the same range of widths and lengths formerly available with cord and fabric carcass belts.

A new hose for connections on oil and coolant lines on Army plane engines was also announced. In contrast to its predecessor, which hardened because of motor heat and broke as a result of pressure and vibration, the new hose withstands severe temperatures, has greater flexibility and strength, and will not harden or break under the most rigorous conditions, according to Goodyear's mechanical goods design department. Produced in eleven sizes, the hose has already been flight tested and approved by the Army Air Forces.

Superior to their prewar predecessors and within the same price range are new washing machine ringer rolls being manufactured by Goodyear. The same rubber compound is used for the entire roll and is super-bonded to the steel shaft of each wringer roll so that the rubber to shaft bonds are said actually to outlast the rubber itself. These wringer rolls, with crimpy-crops and traction giving surfaces which will retain their original resilience throughout the rolls' lives, are the result of several years of development work in rubber compounding. The rolls, being produced in Goodyear plants in all standard sizes with steel shafts long enough so that blank rolls can be cut to fit all washing machines, are distributed through the R & S Co., Milwaukee, Wis.

Goodyear has announced the use of a luminous tape of Vitafilm for "trail blazing" in the jungles of the Pacific; this tape can be made fluorescent or phosphorescent. Goodyear supplies the Vitafilm to Continental Lithographing Co. in 19½-inch widths, where it is coated on one side with luminous paint. A synthetic adhesive layer is then added to the coated Vitafilm. The adhesive is backed up by holland cloth. The luminous material is thus protected indefinitely from dirt, moisture, or vapors.

Mechanicals Surplus Disposal

Solution of a knotty problem concerning surplus mechanical rubber goods has been announced by the Air Technical Service Command headquarters, Wright Field, Ohio. Through the joint efforts of the Readjustment and Supply Divisions of the ATSC, the Treasury Department, representatives of the aircraft and rubber industries, and the WPB Rubber Bureau, a plan has been evolved for disposing of surplus mechanicals. This surplus had resulted from such factors as design and engineering changes, obsolescence, and production revisions dictated by changing war requirements. Accumulations of inventories in aircraft plants posed problems not only of disposition, but of plant clearance.

A number of special features of the inventories complicated disposition. Thus a very high percentage of mechanicals used in aircraft production are non-standard and therefore not normally salable; also deterioration sets in very rapidly with age. Furthermore the various compounds of synthetic rubber used limited disposal possibilities.

As personnel of the ATSC and aircraft manufacturers were not qualified to make the proper initial classification of the surplus items, arrangements were made to enlist the aid of experts from the rubber industry. The inventories were collected at the 831st AAF Specialized Depot, Shelby, O., and examined there by a group including representatives of industry, interested organizations of the ATSC, Rubber Bureau, Treasury Department, and Resources Divi-

sion, Hq., AAF. As a result, a schedule is being developed which will enable plant clearance officers to make immediate classification of surplus mechanical rubber goods from inventory records and to determine their disposition. The items will either be held for sale through commercial channels, held for redistribution within the aircraft industry, sold for reclamation, or scrapped and sold as junk.

Rubber & Chemical Products Co., 520 Mill St., Conneaut, recently was organized to reclaim and manufacture natural and synthetic hard rubber dusts and has purchased all Conneaut interests of A. Schulman, Inc., Akron. As soon as the additional equipment is completely installed, the manufacturing capacity of the plant will be doubled. The new concern also plans soon immediate expansion into other branches of the rubber industry. Leo J. Zeiger, formerly with the Schulman company, is in charge of plant and production; while John Pabarcus heads offices and sales.

Hershberg Products Co., Ashtabula, has received WPB approval for the construction of a factory to cost between $75,000 and $100,000 for the manufacture of hard rubber products for war uses. The company expects to produce hard and soft rubber automotive items and battery and vacuum cleaner parts in the postwar period.

The Lima Cord Sole & Heel Co., Lima, has changed its name to Gro-Cord Rubber Co. because the trade name "Gro-Cord" has long been used for its line of soles, heels, and floor tread. No change has been made, however, in capital structure, affiliations, products, or methods of doing business.

A. T. McGrath has been made divisional manager of the manufacturers sales department of the Firestone Tire & Rubber Co., Akron, O. In this capacity Mr. McGrath has headquarters in Chicago, Ill., and directs the company's original equipment business in the Midwest. Associated with Firestone since 1922, he has served successively as assistant district manager at New York, special factory truck tire representative, district manager at Hartford, Conn., northeastern division sales manager, Boston district manager, and special Washington representative dealing with government agencies.

Giant tires are being produced by Firestone from synthetic rubber for use in earth moving equipment. The largest tire is 9½ feet high and more than three feet wide. These tires carry a load of more than 50,000 pounds. One of the tires has 34 plies, as compared with the four plies on ordinary automobile tires, and the former uses about 140 times as much rubber as the average passenger-car tire. Firestone has mixed new strengthening materials into the synthetic rubber to combat the impact problem, used rayon cord and an improved synthetic rubber compound for the heat problem, and solved the adhesion problem by use of a hair-thin layer of natural rubber between the plies of the tire. The tires make earth moving practical at speeds of more than 20 m.p.h. as compared with the former 10 m.p.h. speed. The tires are receiving manufacturing precedence equal to that of artillery tires because of their important use in laying out airfields and highways.

Disabled war veterans at Halloran General Hospital, Staten Island, heard James J. Newman, Goodrich vice president, on May 16 in one of a series of four talks designed to provide patients with a preview of certain important basic industries here. Among the subjects discussed were the creation of the synthetic rubber industry as a result of the emergency of war and the important part rubber has played in the prosecution of it. Company policies toward returned veterans were also mentioned. The war advertising committee of the Advertising Women of New York arranged Mr. Newman's appearance. Several months ago he presented a similar talk to disabled war veterans at Walter Reed Hospital, Washington.

Akron Group Spring Meeting

The Akron Rubber Group held its spring meeting the evening of May 11 in the Mayflower Hotel in Akron with 450 members and guests in attendance. The program consisted of a cocktail hour, dinner, entertainment, and prizes by the courtesy of more than one hundred suppliers, rubber companies, and other friends of the Group.

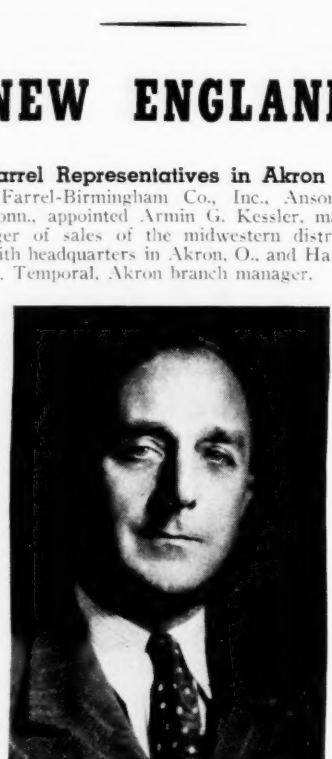
Walter Grote, of Wilmington Chemical Corp., furnished a program of informal magic followed by entertainment by an all-girl orchestra and other stage and radio stars. The prizes distributed to the holders of lucky numbers consisted of 70 War Bonds of various denominations.

Officers of the Group elected for the 1945-1946 term are: chairman, Earl B. Busenburg, Philadelphia Rubber Works Co.; vice chairman, Jack R. Moore, Standard Chemical Co.; and secretary-treasurer, Roy M. Vance, General Tire & Rubber Co.

NEW ENGLAND

Farrel Representatives in Akron

Farrel-Birmingham Co., Inc., Ansonia, Conn., appointed Armin G. Kessler, manager of sales of the midwestern district, with headquarters in Akron, O., and Harry D. Temporal, Akron branch manager.



Armin G. Kessler

Mr. Kessler, also a vice president and director of the company, received his M.M.E. degree from Cornell University in 1910. In 1917 he left the position of general manager of Lakeside Forge Co., Erie, Pa., to serve in the U. S. Navy Reserve as lieutenant and later was assistant chief, gun division, U.S.N. Ordnance Department, Washington, D. C. After leaving the Navy in 1919, he became vice president of General Ordnance Co., Derby, Conn. Mr. Kessler was first associated with Farrel-Birmingham in 1920 as general manager of the Buffalo, N. Y., plant. In 1923 he was elected vice president and director and in January, 1943, went to Ansonia as general works manager of the company's three plants, Ansonia and Derby, Conn., and Buffalo.

Mr. Temporal has been with the company 37 years. He was from the start engaged in machinery sales work and has been in charge of branch offices both in Cleveland and Chicago.

"The placement of Messrs. Kessler and Temporal, a senior executive and a veteran and key sales manager, in the center of the rubber manufacturing area, is an indication of Farrel-Birmingham's feeling of responsibility to the rubber industry and its desire to have authoritative and experienced representation in the district where much of the rubber machinery and equipment manufactured by the company is used," said Franklin R. Hoadley, president of the company, in commenting on the appointments.

"Farrel-Birmingham has made a special effort to keep abreast of the requirements of the rubber industry during the war years. Its engineering department, repair department, laboratory, and a more recently established plan of maintenance and inspection have all rendered valuable service in the rubber production program.

"The recent expansion of rubber production for the military tire program has placed orders with the company for many scores of Banbury mixers, plasticators, rubber mills and calenders, that are now fast being completed and made ready for delivery.

"Many of these will find their location in the midwestern district, and it is an added reason why Farrel-Birmingham has taken steps to strengthen the position of its branch office in this area to give more expeditious and dependable service than ever before."

General Latex & Chemical Corp., 666 Main St., Cambridge 39, Mass., has added to its technical sales organization, Burt Wetherbee, who will be responsible for Western New York, Ohio, Michigan, Pennsylvania, New Jersey, and Maryland. Previously he had been manager of technical service for American Resinous Chemicals Corp., Peabody, Mass. and for a long time prior to that had been manager of research at Globe Woven Belting Co., Buffalo, N. Y. He has been associated with the latex emulsions and dispersions industries for many years and has written several articles on these subjects. As one of the organizers of the Buffalo Rubber Group, Mr. Weatherbee early served in all the offices of that group. Among others, he is a member of American Chemical Society, American Society for Testing Materials, American Institute for Chemists, Society for Automotive Engineers, The Chemists' Club, The Akron City Club, and many local rubber groups. He will continue his headquarters in Buffalo.

Berlow & Schlosser Co. has been formed by Charles Berlow and Harry A. Schlosser with quarters at 537 Industrial Trust Bldg., Providence, R. I., offering sales and consultation service for the rubber and textile industries in southern New England. The firm, besides specializing in research, development, and engineering, will also deal in a line of chemicals, oils, waxes, accelerators, solvents, acids, and specialties.

Charles L. Sheldon, purchasing agent, Hood Rubber Co., Watertown, Mass., last month was elected president of the National Association of Purchasing Agents.

Athol Mfg. Co., Athol, Mass., has developed a new synthetic resin-coated fabric for loose-leaf binders. The new product has a leather-like appearance and handle and is said to be scuff and crack resistant. This resin is one of Athol's Terson line, which is not yet in commercial production in quantity for the civilian market. In the postwar market the new Terson is expected to increase materially the average life of loose-leaf binders.

Boston Group Outing

The outing of the Boston Rubber Group will be on June 22 at the Woodland Golf Club, Newton, Mass. Carl A. Meyer, of Standard Chemical Co., will act as chairman. There will be a soft ball game and dart and horse-race games in addition to golf. After dinner will come the usual drawing of prizes.

MIDWEST

Safety Specimen Forms

A book of specimen forms used in connection with accident prevention in industry has been prepared by the National Safety Council's Rubber Section engineering committee under the chairmanship of Thomas Boyd, of Manhattan Rubber Mfg. Division of Raybestos-Manhattan Inc., Passaic, N. J. Form examples include those used by various companies under the following headings: report of accident; nature of injury summary; cause and agency chart; accident summaries; case records; foremen's safety contacts; plant safety inspections; fire protection; watchmen's reports; elevators and trains; mills, calenders, power presses; pressure vessels; transportation equipment; grounds in churn rooms, and safety rules.

These forms will be published, if 100 subscriptions are obtained, at $5 per copy. The larger the demand, the lower the cost will be. Write to the Rubber Section, National Safety Council, Inc., 20 N. Wacker Dr., Chicago 6, Ill., for further details.

Monsanto Appointments

Monsanto Chemical Co., St. Louis, Mo., has elected Charles Allen Thomas a vice president, and on September 1 he will also become a member of the executive committee. He has been a director since 1942. Dr. Thomas, transferred to St. Louis, is succeeded as director of Monsanto's Central Research Laboratories at Dayton, O., by Carroll A. Hochwalt, associate director of the Research organization.

Norris Boehmer and Clarence Barbre, operating superintendents, have each been advanced to the rank of manufacturing superintendent at Monsanto's plant at Monsanto, Ill., following the death on April 24 of Robert M. Sanford, manufacturing superintendent, and a rearrangement of supervisory duties made necessary by plant expansions. E. W. Lieben, W. Neil, and R. L. Miller have been promoted to operating superintendents at the same plant.

Henry V. Moss has been transferred from the Monsanto research laboratory at Carondelet, Mo., to Anniston, Ala., as supervisor of inorganic research. All research activities at Carondelet have been moved to Anniston to improve coordination of the two sections.

CANADA

C. D. Howe, Minister of Munitions & Supply, Ottawa, Ont., on May 17 announced the removal of rationing on automobile inner tubes, effective June 1, and a revision of tire rationing regulations, making an estimated additional 35,000 vehicle owners eligible for new tires. Because many tires now in use are nearing the end of their life, the output of civilian passenger tires will have to be increased this year to meet essential demands. When manufacturing facilities can be switched from military to civilian production, a further increase may be expected. Removal of rationing on inner tubes is possible, Mr. Howe said, because manufacturing capacity is proportionately greater than tire manufacturing capacity and because no natural rubber is required for inner tubes.

Dominion Bureau of Statistics, Ottawa, Ont., recently reported that the unusually high level of production attained in the oiled and waterproof clothing industry in Canada in 1942 was not maintained in 1943. Not only was output reduced, but also the number of employes and the number of hours they worked per week. The gross value of the 1943 output is given as $4,917,923, a decrease of $356,611, or 6.8%, as compared with 1942; there were 823 persons employed, against 1,084, and their total salaries and wages amounted to $1,052,554, against $1,144,408.

Gloves of natural and synthetic rubber, for the first time since December, 1940, may be imported into Canada again. An order made public March 17, 1945, removed these goods from the list of prohibited imports.

Firestone Tire & Rubber Co. of Canada, Ltd., plans a $1,000,000 extension to its plant in Hamilton, Ont. In making the announcement during a trip to Hamilton to address the Chamber of Commerce on its one hundredth anniversary, Harvey S. Firestone, Jr., president of the parent company, Firestone Tire & Rubber Co., Akron, O., U. S. A., said that the move is aimed at meeting the tremendous postwar backlog of civilian tire demand.

Polymer Corp., Ltd., Sarnia, Ont., following the resignation of R. C. Berkinshaw as president and treasurer, appointed Vice President Douglas Ambridge president. He in turn is succeeded by Gilbert A. LaBine, a director. Besides Managing Director J. R. Nicholson has assumed the added duties of treasurer; while W. J. Dyke, assistant to Mr. Nicholson, succeeds him as secretary. J. F. Hodgson, has been appointed a director of Fairmont Co., which handles sales and services for Polymer Corp., Ltd.

J. Penfield Seiberling, president of Seiberling Rubber Co., Akron, on April 26 addressed the West Toronto Kiwanis Club on "Collectivism *vs.* Individualism." The occasion was the celebration of Kiwanis-International "U. S.-Canada Goodwill Week."

Canadian National Research Council, electrical engineering department, in its present research work on insulations includes investigations of the properties of synthetic rubbers for various applications in the electrical field. The department is cooperating with manufacturers to develop suitable synthetics.

OBITUARY

Robert M. Sanford

ROBERT M. SANFORD, manufacturing superintendent of Monsanto Chemical Co.'s plant at Monsanto, Ill., died of heart disease April 24 in St. Louis, Mo., after a short illness. Entering Monsanto's service as a control chemist at the Monsanto, Ill., plant in 1917, Mr. Sanford became assistant supervisor of the glycerophosphate department at the St. Louis plant in 1919. He served as supervisor of the same department, 1921 to 1932, then returned to the Illinois plant as operating superintendent of phenol departments. He became manufacturing superintendent of organic departments in 1941.

Mr. Sanford was born at Defiance, O., on August 6, 1889, and was educated in local schools, at the University of Ohio, from which he received a B.S. degree in 1916, and at Ohio State University, where he obtained his master's degree in 1917.

He was a member of the American Chemical Society and the American Institute of Chemical Engineers and was active in Boy Scout work at Webster Groves, Mo., where he resided.

Surviving are his wife, a daughter, and a son.

Roy F. Ketchum

A HEART ailment caused the death of Roy F. Ketchum on May 9. Mr. Ketchum began his career in the rubber world with the Syracuse Rubber Co. and later became affiliated with the New York Belting & Packing Co. Then in 1912 he founded the Kansas City Rubber & Belting Co., Kansas City, Mo. He was also a Spanish-American War veteran.

Mr. Ketchum is survived by a wife and a son.

Carl L. Willsey

A HEART attack caused the death on April 22 of Carl L. Willsey, treasurer and assistant secretary of The Mansfield Tire & Rubber Co., Mansfield, O., which he had joined in 1916. Previously he had been associated with G. & J. Tire & Rubber Co., Indianapolis, Ind.

Mr. Willsey was born in Indianapolis in 1882.

He belonged to Mansfield Masonic bodies, Dayton Consistory, Al Koran Shrine of Cleveland, B.P.O. Elks, and the Baptist Church.

He was buried April 24 in Mansfield.

Survivors include the widow, a daughter, and a son.

FINANCIAL

Allied Chemical & Dye Corp., New York, N. Y. For 1944: consolidated net income, $18,025,075, equal to $8.14 a share, against $19,023,679, or $8.59 a share, in 1943; sales, $274,104,501, against $285,323,374; income taxes, $20,632,606, against $20,434,344; provision for contingencies, $3,000,000 against $4,000,000.

American Hard Rubber Co., New York, N. Y. For 1944: net profit, $246,776, equal to $1.25 a common share, against $228,847, or $1.05 a share, the year before.

American Viscose Corp., New York, N. Y. For 1944; net profit, $3,983,440, equal, after preferred dividends, to $1.61 a common share, compared with $5,164,223, or $2.29 a share, the year previous; net sales, $108,483,400, against $101,817,077. First quarter, 1945: net profit, after all charges, $1,059,116, equal to 44¢ a share, against $1,233,200, or 54¢ a share, in the '44 period; net sales, $29,718,944, 8% above the '44 figure.

American Wringer Co., Inc., Woonsocket, R. I. For 1944: net income, before renegotiation, but after taxes, $566,062, equal to $5.09 a share, contrasted with $285,732, or $2.58 a share, in 1943.

American Zinc, Lead & Smelting Co., Columbus, O., and subsidiaries. For 1944: net profit, $907,350, equal to 83c a common share, against $927,887, or 87c a share in 1943; net sales, $28,447,018, against $28,819,242.

Baldwin Locomotive Works, Philadelphia, Pa. For 1944: net profit, $5,264,465, equal to $3.81 a common share, contrasted with $5,073,459, or $3.85 a share, a year earlier; sales, $225,725,737, against $234,068,705.

Belden Mfg. Co., Chicago, Ill. For 1944: net income, $379,083, equal to $1.57 a common share, including postwar refund, against $430,584, or $1.78 a share, a year earlier. March quarter, net income, $118,373, or 49¢ a share, against $91,206, or 38¢ a share, in the 1944 quarter.

Philadelphia Insulated Wire Co., Philadelphia, Pa. For 1944: net profit, $8,791, against $16,594 in 1943.

Philip Carey Mfg. Co., Cincinnati, O., and subsidiaries. For 1944: net profit, $709,716, equal to $1.58 a share, against $765, 902, or $1.72 a share, in 1943; sales, $28,942,110, against $28,956,035.

Columbian Carbon Co., New York, N. Y. For 1944: net income, $3,179,525, equal to $5.91 a share, compared with $3,106,145, or $5.78 a share, the year before; sales, $23,502,381, against $21,188,027; working capital, $10,040,802, against $9,461,703.

Dewey & Almy Chemical Co., Cambridge, Mass. For 1944: consolidated net income, $580,807, equal to $1.89 each on 307,231 common shares, against $566,003, or $1.88 each on 301,208 common shares, in 1943; gross sales, $10,349,665, a record and 16% above the '43 figure.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. For 1944: net income, $80,870,106, equal to $6.60 a common share, against $5.59 a share in 1943; sales, $622,062,712, up 6% over 1943.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., Canada. For 1944: net profit, $169,033, or $2.98 a share, compared with $211,506, or $3.90 a share, in 1943; provision for depreciation, $185,581, against $192,156; income and excess profits tax, $298,000, against $634,000; current assets $4,148,783, against $4,181,170; current liabilities, $687,506, against $842,866; working capital, $3,461,277, against $3,338,316.

Eagle-Picher Company, Cincinnati, O., and subsidiaries. Year ended November 30, 1944: net profit, $1,259,299, or $1.38 a common share, against $1,160,241, or $1.27 a share, for the previous fiscal year; net sales, $46,962,693, against $44,185,653.

Quarter to February 28: net profit, $359,278, equal to 40¢ a common share, against $390,448, or 43¢ a share, in the same quarter a year ago.

Flintkote Co., New York, N. Y. For 1944: net profit, $1,477,394, equal to $1.38 a common share, compared with $1,250,276, or $1.51 a share, in the previous year; net sales, $37,280,966 (a new high), against $30,998,161; domestic taxes, $3,806,484, against $2,215,458; current assets, $20,234,149, against $14,513,620; current liabilities, $6,833,840, against $4,361,661.

General Cable Corp., New York, N. Y. For 1944: net profit, $2,195,549, against $2,078,116 in 1943; taxes, $11,800,000, against $8,777,000; current assets at year-end, $33,607,657, current liabilities, $16,240,677, compared with $28,629,307 and $12,309,883, respectively, a year earlier. March quarter: net income, $675,415, against $517,063 a year ago; taxes, $3,875,000, against $2,300,000.

General Electric Co., Schenectady, N. Y. For 1944: net income, $50,846,000, or $1.76 a common share, contrasted with $44,923,000, or $1.56 a share, in 1943.

General Tire & Rubber Co., Akron, O. Year ended November 30, 1944: net profit, $2,198,569, equivalent to $3.62 a common share, against $1,740,084, or $2.75 a share, in the preceding fiscal year; sales, $73,838,570 (a new high), against $51,987,521.

The B. F. Goodrich Co., Akron, O. For 1944: consolidated net income, $12,015,842, equivalent, after the regular $5 dividend on preferred stock, to $7.64 each on 1,303,255 common shares, compared with $11,584,501, or $7.31 a share, in 1943; consolidated net sales, $419,294,119, against $374,408,710; provision for taxes, $59,163,000, against $66,459,000; reserve for contingencies, $3,500,000, against $4,000,000.

Hewitt Rubber Corp., Buffalo, N. Y. For 1944: net income, $519,985, equal to $3.09 a common share, against $559,167, or $3.32 a share the year before; net sales, $15,845,632, against $16,591,021.

Intercontinental Rubber Co., Inc., New York N. Y., and subsidiaries. For 1944: net income, $355,375, against $595,524 in 1943; current assets, $2,016,160, current liabilities, $189,556, compared with $2,760,291 and $501,120, respectively, on December 31, 1943.

Minnesota Mining & Mfg. Co., St. Paul, Minn. For 1944: net profit, $3,958,103, equal to $4.06 each on 975,765 shares, as compared with $4,022,420, or $4.18 each on 961,260 shares, for 1943; net sales, $62,909,243, against $47,200,400; provision for taxes and renegotiation, $11,589,625, against $8,533,250.

Monsanto Chemical Co., St. Louis, Mo. For 1944: consolidated net income, $5,121,063, equal to $3.30 a common share, compared with $5,365,775, or $3.56 a share, the year before; net sales, $86,996,391 (all-time high), against $81,697,059; provision for income taxes, $11,882,603, against $11,959,888. First three months, 1945, net profit, $1,454,463, equal to 97¢ a share, against $1,132,858, or 72¢ a share, in the first quarter last year; sales, $25,873,654, against $20,063,490.

Mt. Vernon-Woodberry Mills, Inc., Baltimore, Md. For 1944: net income, $659,862, equal to $6.98 a common share, contrasted with $681,864, or $7.17 a share, in 1943.

National Lead Co., New York, N. Y., and wholly owned subsidiaries. For 1944: net income, $7,563,754, equal to $1.79 a common share, compared with $5,200,877, or $1.02 a common share, in 1943; provision for taxes $10,740,382, against $8,336,291; reserves, $830,000, against $570,000; net sales, $166,168,715, against $148,622,919.

National Rubber Machinery Co., Akron O. For 1944: net profit, subject to renegotiation, $323,926, or $2.10 a share, compared with $296,841, or $1.92 a share, after renegotiation settlement in 1943.

The New Jersey Zinc Co., New York, N. Y. For 1944: net income, $5,283,423, equal to $2.70 each on 1,960,000 shares, against $3.05 each on 1,963,264 shares in 1943. First quarter, 1945: net profit, $1,357,442, or 69¢ a capital share, against $1,354,929, or 69¢ each on 1,963,264 shares, in the March quarter last year.

Pittsburgh Plate Glass Co., Pittsburgh, Pa. For 1944: net income, $13,450,636, equal to $6.08 each on 2,211,306 common shares outstanding, against $13,389,588, or $6.06 a share, for the preceding year. First quarter, 1945: consolidated net income, $3,417,000, equal to $1.55 a capital share.

Raybestos-Manhattan, Inc., Passaic, N. J., and domestic subsidiaries. For 1944: net profit, $1,677,465, equal to $2.67 a share, compared with $1,651,160, or $2.63 a share, the year before; reserve for postwar contingencies, $750,000, against $1,000,000; taxes, $8,624,053, against $8,461,112; sales, $62,580,740, against $58,862,857; current assets, $18,756,322; current liabilities, $6,527,849.

St. Joseph Lead Co., New York, N. Y., and domestic subsidiaries. For 1944: net income, $5,153,355, equal to $2.61 each on 1,975,456 common shares compared with $4,033,974, or $2.06 each on 1,955,680 shares, in 1943; taxes, $2,265,047, against $1,690,262.

Sun Oil Co., Philadelphia, Pa., and subsidiaries. For 1944: net income, $13,350,217, equivalent to $4.15 each on 3,119,582 common shares, against $13,353,524, or $4.56 a share, a year earlier; taxes, $18,003,044, against $25,277,813.

Timken Roller Bearing Co., Canton, O., and wholly owned Canadian subsidiary. For 1944: net income, $6,293,590, equal to $2.60 a common share, compared with $6,429,162, or $2.65 a share, the previous year. First three months, 1945: net profit, $1,247,452, or 52¢ a share, against $1,348,049, or 56¢ a share, the first quarter of 1944.

United Carbon Co., Charlestown, W. Va., and subsidiaries. For 1944: net income, $2,232,286, equal to $5.61 a share, contrasted with $2,047,327, or $5.15 a share, for 1943; reserve for contingencies, $250,000, against $300,000; taxes, $1,075,000, against $1,020,000; sales, $13,456,724 (a new high), against $11,394,908; taxes, $1,701,520, against $1,687,088.

United Elastic Corp., Easthampton, Mass., and wholly owned subsidiary. For 1944: net income, $496,197, equal to $3.32 a share, against $338,043, or $2.26 a share, a year earlier.

United States Rubber Co., New York, N. Y., and subsidiaries. For 1944: consolidated net income: $15,832,613, equal, after all charges including $8 a preferred share, to $6.04 a common share, contrasted with $14,163,554, or $5.09 a share, in 1943; consolidated net sales, $443,077,453, against the previous high of $422,271,343 for 1943; taxes, $57,584,271, against $59,193,095; current assets, $157,209,948, including cash and U. S. Treasury Bonds of $27,479,654, against $154,818,635 and cash of $34,803,321 at the end of 1943; current liabilities, $63,477,176, against $45,383,031; inventories, $75,425,099, against $69,580,780.

S. S. White Dental Mfg. Co., Philadelphia, Pa., and subsidiaries. For 1944: net income, $671,292, equal to $2.25 a share, against $644,326, or $2.15 a share, in 1943.

Westinghouse Electric Corporation, East Pittsburgh, Pa. For 1944: net income, $26,019,097, equal to $8.11 a share on outstanding capital stock, against $21,401,568, or $6.67 a share, in 1943; net sales, $835,737,004 against $709,342,717.

New Incorporations

American Tire Machinery, Inc., Los Angeles, Calif. Capital, $500,000. Directors: A. B. and E. Cleveland and N. Cutter, all of Los Angeles.

Commerce Tire & Rubber Co., Inc., Los Angeles, Calif. Capital, $50,000. Directors: K. Sims, M. Tyre, and M. Oliver, all of Los Angeles.

General Tire & Rubber Co. of California, Inc., Los Angeles, Calif. Capital $75,000. Directors: D. A. Kimball, A. H. Rude, and L. Rabadan, all of Los Angeles.

Presto-Rub Mfg. Co., Inc., New York, N. Y. Capital, 200 shares, no par value. H. M. Bobrow, 80 Cedar St., New York. Manufacture rubber articles of all kinds.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Anaconda Wire & Cable Co.	Com.	$0.25	Apr. 23	Apr. 13
Armstrong Rubber Co.	A and B	300% stock	Apr. 10	Apr. 7
Armstrong Rubber Co.	A	0.50	Apr. 10	Mar. 31
Armstrong Rubber Co.	B	0.50	Apr. 10	Mar. 31
Baldwin Rubber Co.	Com.	0.17½	Apr. 21	Apr. 14
Belden Mfg. Co.	Com.	0.30	June 1	May 17
Collyer Insulated Wire Co.	Com.	0.30 irr.	Apr. 2	Mar. 26
Crown Cork & Seal Co.	Pfd.	0.56¼ q.	June 15	May 31
Crown Cork & Seal Co.	Com.	0.50 q.	May 15	Apr. 17
Dayton Rubber Mfg. Co.	"A"	0.25	Apr. 25	Apr. 10
Detroit Gasket & Mfg. Co.	Pfd.	0.30 q.	June 6	May 12
Detroit Gasket & Mfg. Co.	Com.	0.25	Apr. 25	Apr. 7
De Vilbiss Co.	Pfd.	0.17½ q.	Apr. 15	Mar. 31
De Vilbiss Co.	Com.	0.25	Apr. 15	Mar. 31
Flintkote Co.	Com.	0.15	June 11	May 28
Flintkote Co.	$4 Pfd.	1.00 init. q.	June 15	June 5
Garlock Packing Co.	Com.	0.50 q.	Mar. 31	Mar. 24
General Cable Co.	7% Pfd.	1.75 accum.	May 1	Apr. 20
Goodyear Tire & Rubber Co., Inc.	Com.	0.50	June 15	May 15
Goodyear Tire & Rubber Co., Inc.	Pfd.	1.25 q.	June 15	May 15
Hercules Powder Co., Inc.	Pfd.	1.50 q.	May 15	May 4
Lee Rubber & Tire Corp.	Com.	0.50 q.	May 1	Apr. 16
Lima Cord Sole & Heel Co.	Com.	0.10	Mar. 31	Mar. 22
Midwest Rubber Reclaiming Co.	Pfd.	1.00 q.	June 1	May 18
Midwest Rubber Reclaiming Co.	Com.	0.50 q.	May 1	Apr. 19
Norwalk Tire & Rubber Co.	Pfd.	0.87½ q.	July 2	June 15
Okonite Co.	Com.	1.50 q.	May 1	Apr. 16
Thermoid Co.	Pfd.	0.38	May 2	Apr. 30
Tyer Rubber Co.	6% Pfd.	1.50 q.	May 15	May 4
Tyer Rubber Co.	Com.	0.50 s.	May 15	May 4
U. S. Rubber Reclaiming Co.	Pfd.	0.50	May 10	May 4
United States Rubber Co.	Com.	0.50	June 11	May 21
S. S. White Dental Mfg. Co.	Com.	0.30 q.	May 15	Apr. 30

New York Rubber Group Chairman

Harry E. Outcault, head of technical service of the zinc oxide department, St. Joseph Lead Co., 250 Park Ave., New York, N. Y., was recently elected 1945 chairman of the New York Rubber Group.

Harry E. Outcault

Widely known in the rubber industry, Mr. Outcault has been associated with St. Joseph Lead since 1931. He was graduated from Ohio State University with a degree of bachelor in chemical engineering in 1917. During 1917 and 1918 he served the Bureau of Mines as a gas chemist in Pittsburgh, Pa., and in Washington, D. C. His service to the government was continued during the latter part of the first world war and for a short period following it as a second lieutenant in the Chemical Warfare Service. During that time (1918-1919) he was stationed at the Bureau of Standards as commanding officer and at the American University Experiment Station, both in Washington, D. C.

In 1919 and 1920, Mr. Outcault had charge of the lamp life test at the Harrison Lamp Works of General Electric Co. The next two years he was a chemical engineer at the Perth Amboy Chemical Works of the R. & H. Chemical Co., Perth Amboy, N. J. In 1922 he became associated with the New Jersey Zinc Co. Until 1927 he was rubber technologist at the Palmerton, Pa., plant, and from that year until 1931 he was in charge of the technical service to the rubber industry with headquarters in New York.

Mr. Outcault is chairman of the committee on admissions of the American Institute of Chemical Engineers; chairman of the membership committee of the Division of Rubber Chemistry of the American Chemical Society; and vice chairman of Committee D-11 on rubber and chairman of sub-committee XV of Committee D-11 of the American Society for Testing Materials. In addition to membership in these organizations and the New York Rubber Group he is also affiliated with the National Paint, Varnish & Lacquer Association and the American Ceramics Society. His fraternal associations include the American Legion and the Free and Accepted Masons of Ohio, Lodge No. 475, Baltimore, O.

He was born Harry Ellsworth Outcault at Basil, O., April 4, 1895.

Mr. Outcault is married and has a 16-year-old daughter. The Outcaults live at 7 Lorraine Rd., Summit, N. J.

Patents and Trade Marks

APPLICATION

United States

2,372,834. **Combined Goggles and Respirator.** J. S. Kish, Youngstown, O.

2,372,885. **Resilient Sealing Member for a Jar.** G. T. Derby, Jacksonville, Fla.

2,373,221. **Flexible Container and Support.** R. C. Baylock and H. R. Berrisford, Bexley, O., assignors to Curtiss-Wright Corp., a corporation of Del.

2,373,281. **As a Bottom Bar for a Storage Battery Plate, a Prefabricated, Elongated Trough-Shaped Bar of Thermoplastic Synthetic Resin Material.** C. C. White, Johnsville, assignor to Electric Storage Battery Co., Philadelphia, Pa.

2,373,285. **Hermetically Sealed Envelope Including a Sheet of Metal Foil Provided with a Film of Rubber Hydrochloride Secured to One Face.** C. A. Baer, New York, N. Y.

2,373,357. **Polyvinyl Alcohol as a Coating for a Base Element in an Improved Method of Making Planographic Printing Plates.** W. C. Toland and E. Bassist, both of Brookline, Mass., assignors to W. C. Toland, trustee.

2,373,388. **Prefabricated Rubber Ring of U-Shaped Cross-Section as Seal between a Pair of Spaced Goggle Lenses.** C. Fischer, New York, N. Y.

2,373,479. **In an Electro-Magnetically Operated Device Including an Electro-Magnet, an Armature and an Armature-Supporting Pin, a Rubber Bush between Pin and Armature.** J. O. Knowles, Colwyn Bay, and M. N. Humphreys, Llandudno, both in North Wales, and J. S. Davies, assignors to Brookhirst Switchgear, Ltd., both of Chester, England.

2,373,586. **Plastic Covered Safety Clasp Pin.** E. G. Marinetti, East Providence, R. I.

2,373,596. **Oil Repellent Cover for a Shoe Upper.** G. Popik, Hartford, Conn.

2,373,597. **In an Adhesive Composition for Waxed Paper, the Use of an Aqueous Dispersion of Rubber and Corn Syrup.** J. R. Purdon, Akron, O., assignor to B. F. Goodrich Co., New York.

2,373,599. **Tire Tread of Vulcanized Rubber Containing a Polycyclic Aromatic Hydrocarbon Having not more Than Four Hydrocarbon Rings, to Give Improved Resistance to Heat Build-up Caused by Repeated Flexures.** J. Rehner, Jr., Wadsworth, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,373,756. **In a Railway Truck, a Lever Member Supported on a Wheeled Axle, a Truck Frame Including a Wheel Piece Member above and in the Same Longitudinal Plane as the Lever Member; One of these Members Has a Projection, and the Other a Cup-Like Recess Lined with Rubber-Like Material.** J. J. Hartley, Granite City, Ill., and J. C. Travilla, Philadelphia, Pa., assignors to General Steel Castings Corp., Granite City, Ill.

2,373,876. **Fiber working Unit for Textile Machines Having a Surface Layer Essentially Composed of Highly Elastic Synthetic Rubber of the Polymerized Halogenated Acetylene Type Compounded with Carbon Black of the Acicular Type to Prevent the Fiber from Adhering to the Surface Layer.** R. W. Cutler, Boston, Mass.

2,373,940. **Inflatable Utility Glove.** H. W. Beall, Mishawaka, Ind.

2,373,947. **Dress Shield.** F. Chernoff, Philadelphia, Pa.

2,374,056 and 2,374,057. **In a Laminated Glass Structure, a "Sandwich" of Thermoplastic between Two Sheets of Glass.** G. B. Watkins, assignor to Libbey-Owens-Ford Glass Co., both of Toledo, O.

2,374,200. **Inflation Equipment including an Inflatable Life Raft.** H. E. Heigis, West Orange, assignor to Specialties Development Corp., Bloomfield, both in N. J.

2,374,296. **Submarine Flotation Device Including an Inflatable Balloon Casing.** Y. S. Ming, Los Angeles, Calif.

2,374,299. **Sleeping Bag for Infants, Including an Upper Shaped Portion and a Lower Portion with Detachable Waterproof Inner Bag.** J. G. O'Hara, Margate, N. J.

2,374,332. **Self-Sealing Fuel Tank.** R. A. Crawford, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,374,372. **To Impart Reserve Buoyancy to Water-Borne Craft, an Assembly of Air-Filled Cylinders Formed a Textile Fabric Coated with an Artificial Organic Water-Resistant Polymer to Stiffen the Fabric and Render It Waterproof.** W. H. Moss, assignor to British Celanese, Ltd., both of London, England.

2,374,482. **In Apparatus for Shrinking Textile Fabrics, the Use of an Endless Flexible and Elastic Band.** J. J. Hadfield, Disley, and D. Bamford, Middleton, both in England.

2,374,487. **For a Shoe Upper, a One-Piece, Preformed Outer Sole of Sponge Rubber.** B. Jayne, Richmond Hill, assignor of one-half to D. Calderazzo, Dolgeville, both in N. Y.

2,374,506. **Buoyant Apparel.** A. Schorovsky, New York, N. Y.

Dominion of Canada

426,328. **Collapsible Pneumatic Float for Buoyant Support of a Body Structure.** A. N. Spanel, Princeton, N. J., U. S. A.

426,347. **A Reenforced Insole Including a Leather Sole Body and a Layer of Polymerized Vinyl Compound Applied in Liquid Form.** Beckwith Mfg. Co., assignee of R. B. Harrison, both of Dover, N. H., U. S. A.

426,363. **Bottle Cap Having a Metal Shell, a Cushion Liner, and a Facing Adhered to the Liner by an Adhesive Consisting of a Resin, a Wax, and Rubber.** Crown Cork & Seal Co., Inc., assignee of A. H. Warth and E. Lidard, all of Baltimore, Md., U. S. A.

426,444. **An Electric, Rubber-Insulated Cable with Partially Bared Conductors and Rubber Means to Prevent Leakage of Fluid along the Interior of the Cable.** R. L. Gold and J. Beresford & Son, Ltd., assignee of one-half of the interest, both of Birmingham, England.

426,449. **Rain Cape for Sport or Military Purposes.** Cajs-Marie Nygren, Stocksberg, Stocksund, assignee of E. H. Wallin, Arvika, both in Sweden.

426,465. **Airscrew Blade Secured with the Aid of a Resilient Material Like Rubber.** B. Jablonsky, Esher, Surrey, England.

426,480. **Protective Sheath for Surgical and Medical Uses, Having Thin Flexible Elastic and Resilient Walls.** E. T. Wyman, Brookline, Mass., U. S. A.

426,485. **In Making Paper of Increased Water Resistance, the Use of a Melamine-Formaldehyde Condensation Product.** American Cyanamid Co., New York, N. Y., assignee of C. G. Landes, New Canaan, and C. S. Maxwell, Old Greenwich, both in Conn., both in the U. S. A.

426,535. **Belting of Textile and Rubber.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of W. Lord and S. A. Brazier, both of Manchester, England.

426,553. **Windshield.** Lockheed Aircraft Corp., Burbank, assignee of J. G. Shonts, Glendale, and J. B. Pray, North Hollywood, all in Calif., U. S. A.

426,593. **Bottle Closure.** Wingfoot Corp., Akron, O., assignee of J. E. Snyder, Camp Livingstone, La., both in the U. S. A.

426,716. **Insulating Body Formed of a Continuous Sheet of Fibrous Material Wound into Cylinder Form and Having the Superficial Layers Acetylated and Impregnated with a Synthetic Resin.** International Standard Electric Corp., New York, N. Y., U. S. A., assignee of J. K. Webb, London, England.

426,717. **Multilayer Fibrous Resin-Bearing Article.** Keyes Fibre Co., assignee of E. E. Sawyer, both of Waterville, Me., U. S. A.

426,728. **Cushion Including a Cushion Body of Spongy Rubber and Spring Units.** Mishawaka Rubber & Woolen Mfg. Co., Mishawaka, assignee of F. A. Sawyer, South Bend, both in Ind., U. S. A.

426,938. **Electric Eraser.** J. H. McElroy, Pearl River, and F. W. Kalkhuis, Orangeberg, both in N. Y., U. S. A.

426,939. **Foundation Garment with Elastic Inserts.** L. J. A. Amyot, Quebec, P. Q.

426,986. **Insulated Electric Conductor.** Canada Wire & Cable Co., Ltd., Leaside, Ont., assignee of General Cable Corp., New York, N. Y., assignee of R. W. Atkinson, Westfield, N. J., both in the U. S. A.

427,044. **Resilient Mounting.** Lord Mfg. Co., assignee of L. Wallerstein, both of Erie, Pa., U. S. A.

PROCESS

United States

2,372,982. **Temporary Surface Protection of Plastic Sheets.** A. B. Richards, J. A. Mickey, and J. T. O'Reilly, assignors to Ford Motor Co., all of Dearborn, Mich.

2,373,093. **Treatment of a Body of Solid, Glassy, Amorphous Thermoplastic Polymer to Improve Cracking Resistance.** W. O. Baker, Morristown, N. J., assignor to Bell Telephone Laboratories, Inc., New York, N. Y.

2,373,689. **Process of Producing and Utilizing Guayule Rubber.** P. Kenda, San Antonio, Tex.

2,373,690. **Producing Lumber from Poinsettia Plants in Which the Latex Is Enclosed within Plant Cells.** P. Kenda, San Antonio, Tex.

2,373,899. **Ball for Games.** L. M. S. Lejeune, Paris, France; vested in the Alien Property Custodian.

2,373,922. **Improved Method of Attaching Soles to Shoes.** M. W. Tetlow, Sharon, assignor to B. B. Chemical Co., Boston, both in Mass.

2,374,308. **Thick Sheets of a Thermoplastic Cellulosic Compound.** J. H. Rooney, R. S. Locke, and P. R. Hawtin, all of Spondon, assignors to British Celanese, Ltd., London, both in England.

2,374,514. **Electric Cables.** R. S. Vincent, assignor to Callender's Cable & Construction Co., Ltd., both of London, England.

Dominion of Canada

426,386. **Sound Record of a Pulp Mixture and Synthetic Resin.** Keyes Fibre Co., assignee of E. E. Sawyer, both of Waterville, Me., U. S. A.

426,639. **Wheel Trim Members.** G. A. Lyon, Allenhurst, N. J., U. S. A.

426,745. **Forming a Homogeneous Deposit Free from Occluded Air Bubbles from a Solution of Polyvinyl Alcohol, by Spraying.** Resistoflex Corp., Belleville, assignee of W. MacWilliam, Nutley, both in N. J., U. S. A.

426,785. **Granules of Plastic Material Suitable for Molding.** C. Dreyfus, New York, N. Y., assignee of R. P. Piperoux and D. G. Soussloff, both of Newark, N. J., both in the U. S. A.

426,969. **Puncture-Sealing Inflatable Hollow Rubber Article.** E. T. Wyman, Brookline, Mass., U. S. A.

CHEMICAL

United States

2,372,641. **Composition of Matter Consisting of a Poly-Carboxylic-Acid-Reacted Sub-Rubbery Polymeric Sulphur-Converted Polyhydric Alcohol Ester.** G. Allen, Long Beach, Calif., assignor to Petrolite Corp., Ltd., St. Louis, Mo.

2,372,793. **Forming Closed Cell Cellular Expanded Rubber by Incorporating Vulcanizing Material, Threads of Cotton Yarn Impregnated with Sulphur Chloride, and Impregnating the Rubber Mass with Externally Applied Gas under Pressure.** H. Pfleumer, New Brunswick, N. J., assignor to Rubatex Products, Inc., New York, N. Y.

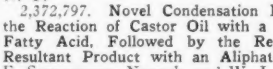
2,372,797. **Novel Condensation Products from the Reaction of Castor Oil with a Non-Hydroxy Fatty Acid, Followed by the Reaction of the Resultant Product with an Aliphatic Polyamine.** E. Segessmann, Newark, and W. L. Abramowitz, Lakewood, assignors to National Oil Products Co., Harrison, all in N. J.

2,372,808. **As a New Compound, an Ester Having the Formula:**

$$\begin{matrix} CH_2OCH_2CH_2COO-\text{Butyl}(n) \\ | \\ CH_2OCH_2CH_2COO-\text{Butyl}(n) \end{matrix}.$$

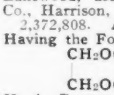
H. A. Bruson, assignor to Resinous Products & Chemical Co., both of Philadelphia, Pa.

2,372,809. **A Thiocyano Ether Alcohol Having the Formula**

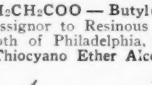


Where X Is of the Group of Hydrogen and Methyl, and n is an integer from 1 to 3 Inclusive. H. A. Bruson, assignor to Röhm & Haas Co., both of Philadelpha, Pa.

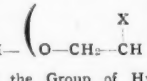
2,372,895. **Vulcanizing Rubber in the Presence of a Compound Containing the Grouping**



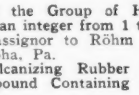
Where R Is an Alkylene Radical, R′ an Alkyl Radical, and R″ a Substituent of the Class Consisting of the Radical

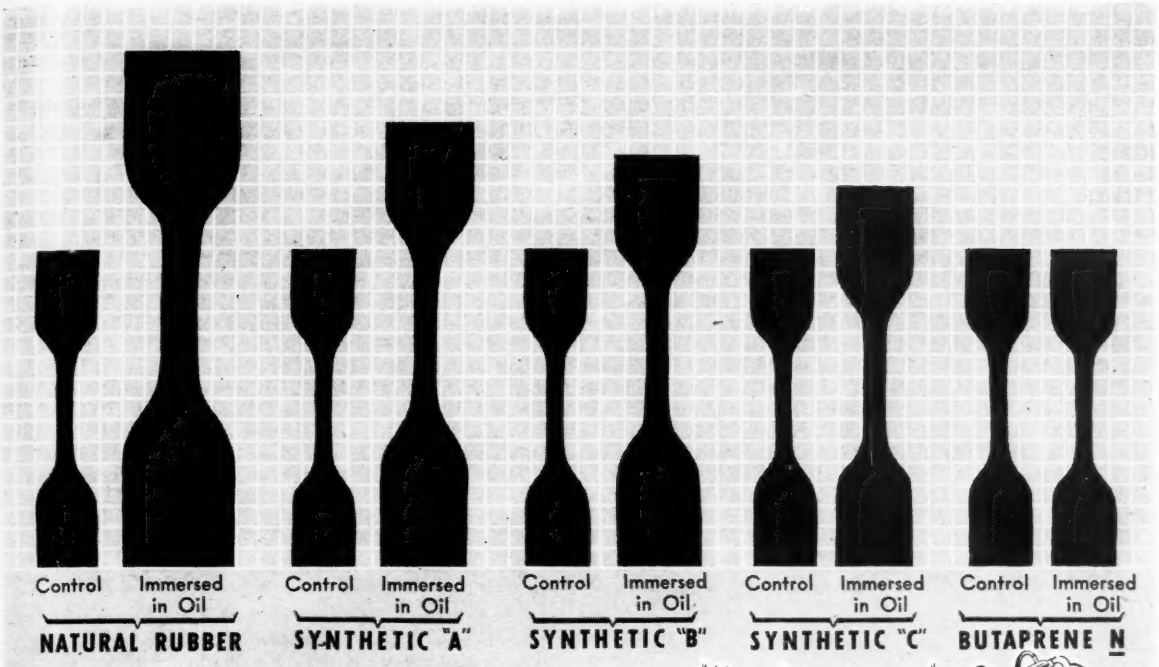


the Radical



the Radical





THESE DUMBBELLS ARE NOT SO DUMB!

JUST little strips of rubber! But they tell a whale of a story of *oil resistance* — one of the outstanding characteristics of Butaprene-N. All were immersed in the same oil bath for the same length of time. Notice the difference as compared with the unimmersed control strips. Natural rubber couldn't take it, soon swelled up, became a soft, sticky, useless mass. Notice, too, that synthetic rubbers vary widely in this important property. *And notice that Butaprene-N is practically unaffected.*

These Butaprene-N Synthetic Rubbers have other important properties that are finding vast new uses in industry. They function well in extreme heat or cold, wear well, resist aging, have high tensile strength. The Butaprene Technical Staff is ready to work with you on *any* problems involving the use of synthetic rubber. For complete information on Butaprene-N simply write XYLOS RUBBER COMPANY, Akron 1, Ohio.

BUTAPRENE N by Firestone

THE SYNTHETIC RUBBER OF A THOUSAND POSTWAR USES

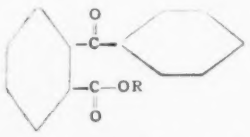
Resists **: OIL • GASOLINE • HEAT • SUB-ZERO COLD • AGING • ABRASION**

Copyright, 1945, The Firestone Tire & Rubber Co.

and Metallic Salt Forming Radicals. M. W. Harman, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,372,941. **Separating a Mixture of Isoprene and Mono-Olefins Having Boiling Temperatures Close to That of Isoprene.** T. W. Evans, Oakland, R. C. Morris, Berkeley, and E. C. Shokal, Oakland, assignors to Shell Development Co., San Francisco, all in Calif.

2,372,947. **Composition Including a Polymer Made from Vinyl Chloride and a Plasticizer Having the Formula**



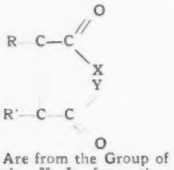
Where R Is an Alkyl Group Containing More Than Three Carbon Atoms. T. L. Gresham, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,372,980. **Plastic Composition Consisting of a Cellulose Mixed Ester and a Plasticizer Containing a Compound from the Group of p-Tertiary Butyl Phenoxy Ethanol, p-Tertiary Amyl Phenoxy Ethanol and p-Tertiary Butyl Phenoxy Ethyl Acetate.** F. E. Piech, Sayreville, N. J., assignor to Hercules Powder Co., Wilmington, Del.

2,373,015. **Producing High Polymers by Vulcanizing Dihydric Alcohol Polyesters of Polymeric Acids Derived from Monomers Containing Unsaturated Acyl Radicals Containing at Least Two Double Bonds.** J. C. Cowan and W. C. Ault, Peoria, Ill., assignors to C. R. Wickard, as Secretary of Agriculture of the United States of America, and to his successors in office.

2,373,058. **Phenol-Aldehyde Condensation Products.** S. H. Silberkraus, Springfield, Mass., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,373,067. **Synthetic Resin Including Interpolymerized Dimethallyl Ether and a Compound of the Formula**



Where R and R' Are from the Group of Hydrogen and Alkyl Radicals, X Is from the Group of Hydroxyl and Monatomic Oxygen, and Y from the Group of Oxyalkyl, Hydroxyl, and Monatomic Oxygen. R. M. Thomas, Union, and W. J. Sparks, Cranford, N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,373,135. **Condensation Product of a Highly Polymeric Hydroxylated Polymer with a Monocyclic Urea.** R. W. Maxwell, Seaford, Del., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,373,136. **Ethylene Urea Derivatives.** F. W. Hoover and G. T. Vaala, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,373,153. **Improving the Dehydration of 1,3-Butylene Glycol to Produce 1,3-Butadiene.** R. C. Tolleifson, Stamford, Conn., assignor to Air Reduction Co., Inc., New York, N. Y.

2,373,173. **Increasing the Plasticity of Rubber by Milling Unvulcanized Rubber in the Presence of a Small Amount of a Salt of a Pseudo-Urea.** R. T. Dean, Stamford, Conn., assignor to American Cyanamid Co., New York, N. Y.

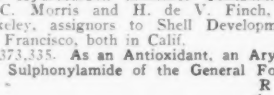
2,373,190. **Production of an Alpha-Beta Unsaturated Aliphatic Acid Nitrile by Catalytically Dehydrating an Alpha-Beta Unsaturated Aliphatic Acid Amide in the Vapor Phase in the Presence of a Manganese Oxide Catalyst.** F. E. Kung, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,373,212. **Air-Blown Heat Reaction Product of Rosin Modified Alkyd Resin and Unblown Drying Oil.** W. A. Waldie, assignor to New Wrinkle, Inc., both of Dayton, O.

2,373,308. **For Bonding a Supporting Base Layer and a Layer of Rubber Composition an Adhesive Consisting of Rubber Chloride and 1,3-Dichlor 5.5-Dimethyl Hydantoin.** C. M. Grafton, Grosse Pointe, Mich., assignor to United States Rubber Co., New York, N. Y.

2,373,329. **Recovering Isoprene and Piperylene from Hydrocarbon Mixtures Containing Them.** R. C. Morris and H. de V. Finch, both of Berkeley, assignors to Shell Development Co., San Francisco, both in Calif.

2,373,335. **As an Antioxidant, an Aryl Aminoaryl Sulphonylamide of the General Formula**

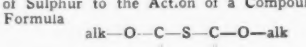


Where Aryl and Arylene Represents an Aromatic Radical from the Class of the Benzene and Naphthalene Series; and R and R_1 Are Radicals from the Group of Separate Open-Chain Alkyl Radicals, and Joined Alkylene Radicals. P. T. Paul, Naugatuck, Conn., assignor to United States Rubber Co., New York, N. Y.

2,373,343. **Reaction Product of a Material from the Group of the Monomers and Polymers of Acyclic Terpenes Having Three Double Bonds per Molecule and an Alkyl Mercaptan.** A. L. Rummelsburg, assignor to Hercules Powder Co., both of Wilmington, Del.

2,373,362. **Thermosetting Composition Including a Urea-Formaldehyde Reaction Product and Cinnamhydroxamic Acid as a Latent Curing Catalyst.** H. A. Walter, Columbia, Mo., assignor to Libbey-Owens-Ford Glass Co., Toledo, O.

2,373,373. **Increasing the Plasticity of Unvulcanized Rubber by Subjecting It in the Absence of Sulphur to the Action of a Compound of the Formula**



Where X Is from the Group of Sulphur and Oxygen, and Alk Represents an Organic Radical Having an Alkyl Carbon Atom Linked to X. E. S. Blake, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,373,419. **Polymerizing an Acyclic Terpene Having Three Double Bonds per Molecule.** A. L. Rummelsburg, assignor to Hercules Powder Co., both of Wilmington, Del.

2,373,446. **Bubble-Free Solid Bodies Prepared from a Syrup of a Polymer from the Group of the Esters of Acrylic and Methacrylic Acids Dissolved in a Monomer from the Group of the Esters of Acrylic and Methacrylic Acids.** D. H. Beaton, Arlington, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,373,461. **Gasket Material Made from Oil-Resistant Elastic Sulphur-Vulcanizable Material from the Group of a 2,Chlorobutadiene 1,3 Polymer and a Butadiene Acrylonitrile Copolymer; Asbestos and Comminuted Mineral Wool; and Vulcanizers and Modifying Agents.** D. S. Crampton, Oak Park, Ill., assignor to Felt Products Mfg. Co., Chicago, Ill.

2,373,464. **Preparing an Alkyl Ester of Methacrylic Acid from a Mixture of Acetone Cyanhydrin Oleum and an Aliphatic Alcohol in the Presence of a Polymerization Inhibitor from the Group of Hydroquinone and Pyrogallol.** H. R. Dittmar, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,373,488. **A Syrup of Methyl Methacrylate Containing Methacrylic Acid, for Forming Cast Sheets between Two Glass Plates Separated by a Compressible Gasket.** B. M. Marks, Newark, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,373,529. **Two Intermested, non-Adherent Bag-Like Deposits of Rubber.** C. L. Beal, Silver Lake, assignor to American Anode, Inc., Akron, both in O.

2,373,561. **Producing Normally Solid Hydroxyl Group-Containing Polymers by Reacting a Formaldehyde with a Mono-Olefin from the Group of Ethylene, Propylene, and the Isobutylenes in the Presence of a Per-Oxy Compound Catalyst.** W. E. Hanford, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,373,613. **For Treating Fibrous Materials, a Composition Including a Phenol-Aldehyde Resin, a Resilient Solid High Molecular Weight Polymer of Isobutylene, and Natural Rubber.** A. Szegvari, Fairlawn, and A. H. Feikert, Wadsworth, assignors to American Anode, Inc., Akron, all in O.

2,373,614. **An Aqueous Dispersion Containing a Resilient Solid High Molecular Weight Polymerization Product of a Low Molecular Mono-Olefin, Shellac, and a Rubber from the Group of Natural Rubber, Polychloroprene, Reclaimed Rubber, and Butadiene Synthetic Rubber Other Than a Copolymer of Butadiene and Acrylic Nitrile.** A. Szegvari, Fairlawn, and A. H. Feikert, Wadsworth, assignors to American Anode, Inc., Akron, all in O.

2,373,615. **Aqueous Dispersion Containing a Resilient Solid High Molecular Weight Polymerization Product of a Low Molecular Mono-Olefin; a Tack-Reducing Copolymer of Butadiene and Acrylic Nitrile; and a Rubber from the Group of Natural Rubber, Polychloroprene, Reclaimed Rubber, and Butadiene Synthetic Rubber Other Than a Copolymer of Butadiene and Acrylic Nitrile.** A. Szegvari, Fairlawn, and A. H. Feikert, Wadsworth, assignors to American Anode, Inc., Akron, all in O.

2,373,699. **Low-Temperature Resistant Rubber-Like Resin Composition.** A. J. McGillicuddy, assignor of one-half to G. A. Kjosness, both of Spokane, Wash., and one-fifth to B. H. Levenson, Washington, D. C.

2,373,706. **Preparing a Solid Copolymer of a Terpene and Isobutene.** E. Ott, assignor to Hercules Powder Co., both of Wilmington, Del.

2,374,714. **Polymerizing Indene Substantially Free from Coumarone by Contacting the Indene with a Catalyst from the Group of Alkyl and Aryl Acid Sulphates.** F. J. Soday, Upper Darby, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,373,717. **Adding Ammonium Carbonate to the Reaction Solution at the Completion of the Reaction, in a Process for Producing Pentaerythritol by Condensing Acetaldehyde with Formaldehyde in the Presence of an Alkaline Earth Metal.** G. Spiller, assignor to Hercules Powder Co., both of Wilmington, Del.

2,373,753. **Polymerization of Monomeric Material Containing a Conjugated Butadiene in an Aqueous Emulsion Containing at Least Two Alkali Metal Salts of Fatty Acids.** C. F. Fryling, Silver Lake, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,373,754. **A Stabilized Butadiene-1,3 Composition Including Monomeric Butadiene-1,3 and an Aliphatic Mercaptan Containing Six to 10 Carbon Atoms.** C. F. Fryling, Akron, and W. L. Semon, Silver Lake, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

2,373,777. **Formaldehyde Polymers Solubilized by Hexamethylenetetramine.** O. Peterson, Elizabeth, N. J., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del.

2,373,782. **Forming Polyvinyl Alkyl Ether by Reacting an Alkyl Halide with an Alkali Metal Alcoholate of a Polyvinyl Alcohol in Liquid Ammonia.** R. A. Scheiderbauer, Kenmore, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,373,954. **In the Manufacture of Highly Stiffened Fibrous Materials, the Impregnation of the Fibers with a Solution in a Volatile Solvent of a Polyvinyl Acetate.** P. Frankfurther, London, England.

2,373,982. **Production of Styrenes and Other Useful Products from Benzol Still Residues.** M. G. Sturrock and T. Lawe, assignors to Dominion Tar & Chemical Co., Ltd., all of Montreal, P. Q., Canada.

2,373,996. **An Electrical Insulation Composition Including Polymerized Rosin and Gum Accroides.** J. N. Borglin, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,374,051. **Preparing Acrylonitrile from Ethylene Cyanohydrin.** Le R. U. Spence, Elkins Park, assignor to Röhm & Haas Co., Philadelphia, both in Pa.

2,374,067. **Resinous Compositions Including a Polyvinyl Acetal.** W. L. Alderson, Jr., assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,374,069. **Plasticizing Linear Polyamides.** J. H. Balthis, assignor to E. I. du Pont De Nemours & Co., Inc., both of Wilmington, Del.

2,374,077. **Resins Obtained from an N,N'-bis (Alkoxymethyl) Urea and an Alkylolamine.** W. J. Burke, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,374,078. **Copolymer of Divinyl Formal and Vinyl Acetate.** D. D. Coffman, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,374,081. **Polymer of a Composition Consisting of a Saturated Aliphatic Monocarboxylic Acid and an Allyl Alcohol.** R. T. Dean, Stamford, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,374,098. **Preserving Rubber with the Aid of the Condensation Product of an Aliphatic Ketone and a Primary Amine Having the Structure**

Where the R's Are Arylene Groups, at Least One of Which Bears a Primary Amino Group, and X Is a Non-Metallic Divalent Bridge Forming Group Completing a Five Membered Ring; This Bridging Group Includes an Element Which Forms a Heat Stable Hydride, Any Valences in Excess of Two Being Satisfied by Hydrogen. J. R. Ingram, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,374,101. **Reclaiming Rubber with the Aid of a Hot Caustic Alkali Solution and a Small Portion of a Devulcanization Accelerator Consisting of a Synthetic Hydrocarbon Fraction Boiling Around 425 to 650° F., obtained from the Conversion of Petroleum Oils.** H. A. Jackson, Mount Lebanon, assignor to Hall Laboratories, Inc., Pittsburgh, both in Pa.

2,374,121. **Tautened Fabric Impregnated with a Solution of Chlorinated Ethylene Polymer.** I. R. Myles and D. Whittaker, Northwich, and F. J. Siddle, Manchester, both in England, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

2,374,137. **Obtaining an Improved Polyamide Composition from a Mixture of Different Preformed Synthetic Linear Polyamides.** L. F. Salisbury, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,374,145. **Synthetic Linear Polyamide with Improved Resistance to Degradation.** G. B. Taylor, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,374,237. **Manufacture of Vinyl Chloride by the Simultaneous Thermal Decomposition of Ethylene Dichloride and Chlor-Substitution of Ethylene.** H. M. Stanley, Tadworth, and J. E. Youell, Wallington, both in England, assignors to Distillers Co., Ltd., Edinburgh, Scotland.

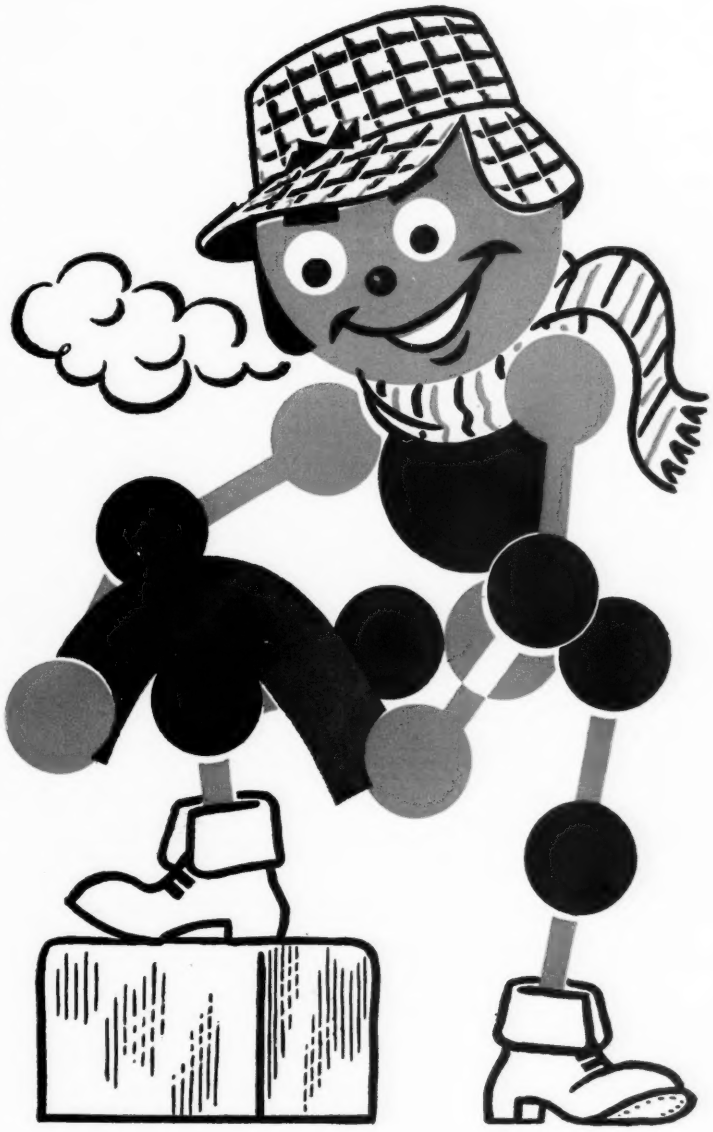
2,374,242. **Polymerization of an Olefin Containing Light Oil Piperylene Fraction and Unsaturated Hydrocarbons.** F. J. Soday, Swarth-

If you need a compound for extreme low temperature service...

COMPOUND NUMBER	5561-3
Perbunan	100.0
Zinc Oxide	5.0
Stearic Acid	1.0
Benzothiazyl disulfide	1.0
Sulfur	1.5
S.R.F. Black	25.0
F.T. Black	25.0
Tributoxyethyl phosphate	15.0
Plasticizer SC*	15.0
Protective Wax**	2.0
PHYSICAL PROPERTIES	
Original Sample—Cured 45' @ 287°F	
Shore Hardness	38
Tensile psi	1600
Elongation, %	670
% Compression Set, ASTM Method B, 70 hrs. @ 212°F	
40% Deflection	66
Oven Aging, 70 hrs. @ 212°F	
% Change, Tensile	+15
% Change, Elongation	−22
Points Shore Change	+ 9
180° Bend Test	O.K.
Immersion for 70 hrs. @ Room Temperature in ASTM Test Oil #3 Aniline Point 158°F	
% Change, Tensile	+ 9
% Change, Elongation	+15
Points Shore Change	+ 5
% Change, Volume	− 3
SAE—ASTM Low Temperature Bend Test, 5 hrs. @ −70°F	O.K.

* Diisobutyl Azelate may be used.
** Sun Proof, Heliozone, Antisol.

This compound can be used wherever it is necessary to have good oil resistance and excellent flexibility at low temperature.



SAE—ASTM Low Temperature Bend Test 5 hrs. in Cold Air—O. K. at −70°F.

There is a Perbunan compound for every need. Consult your Perbunan Compounding and Processing Manual. If you haven't received one yet, drop a line or phone us today.

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THE SYNTHETIC RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME

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more, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,374,253. **Dehydrating 1,3-Butylene Glycol to Produce 1,3-Butadiene.** C. S. Wynn, Darien, Conn., assignor to Air Reduction Co., Inc., New York, N. Y.

2,374,272. **Polymerizing Isobutylene in the Liquid State with a Boron Fluoride Catalyst at Low Temperature.** M. T. Carpenter, Chicago, and C. F. Feuchter, Hammond, assignors to Standard Oil Co., Chicago, both in Ill.

2,374,316. **Thermoplastic and Oil-Soluble Resin Consisting of a Monomeric Styrene Reacted with an Inherently Oil-Soluble Phenol-Aldehyde Resin.** L. R. Whiting, Woodbridge, N. J., assignor to Bakelite Corp., New York, N. Y.

2,374,340. **Hexamethylene Diisocyanate.** M. W. Farlow, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,374,354. **Polymeric Amino Diimidazolines.** S. Kaplan, Rutherford, assignor to Richards Chemical Works, Jersey City, both in N. J.

2,374,385. **Vulcanizing a Copolymer of a Conjugated Diene Hydrocarbon and an Alpha-Methylene Nitrile in the Presence of a Vulcanizing Agent Including a Bis(Oxythiono) Polysulphide.** D. E. Sauser, Cuyahoga Falls, O., assignor by mesne assignments to B. F. Goodrich Co., New York, N. Y.

2,374,405. **Producing 1,3-Butadiene by Dehydration of 1,3-Butylene Glycol.** F. B. Balcar, Stamford, Conn., assignor to Air Reduction Co., Inc., New York, N. Y.

2,374,433. **Producing Butadiene by Subjecting Ethyl Alcohol under Reaction Condition to Contact with a Catalyst Consisting of Magnesium Oxide.** V. N. Ipatieff, assignor to Universal Oil Products Co., both of Chicago, Ill.

2,374,446. **Metallic Soap-Resin Solutions.** R. E. Madison, Detroit, Mich., assignor to Truscon Laboratories, Inc., a corporation of Mich.

2,374,576. **Composition Including a Linear Polyamide and a Phenol Containing Hydroxylphenyl Nuclei.** M. M. Brubaker, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,374,589. **Abrasion-Resistant Synthetic Rubber-Like Mass from Conjugated Diolefin, a 2-(Δ1)-Alkenyl-Aromatic Compound and an Unsaturated Ketone.** R. R. Dreisbach, assignor to Dow Chemical Co., both of Midland, Mich.

2,374,598. **Resinous Reaction Product of Ingredients Including Hydroxyacetic Acid Polyhydric Alcohol, Polybasic Carboxylic Acid, and a Substance from the Group of Linseed Oil Acids and Linseed Oil.** H. W. Gray, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,374,602. **Textile Printing Emulsions Consisting of at Least One Water Insoluble, Organic Solvent Soluble Heat Convertible Synthetic Resin in a Volatile, Predominantly Non-Aromatic Hydrocarbon Vehicle.** R. H. Kienle, Bound Brook, and A. L. Peiker, East Bound Brook, both in N. J., assignors to American Cyanamid Co., New York, N. Y.

2,374,603. **Coating Material for Plastics.** S. M. Kolar, Chicago and A. G. Sternberg, Glen Ellyn, assignors to Allied Finishing Specialties Co., Chicago, both in Ill.

Dominion of Canada

426,356. **Coating Composition Including a Partially Polymerized Diallyl Ester of a Dicarboxylic Acid and an Allyl Ester.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of G. F. D'Alelio, Pittsfield, Mass., U. S. A.

426,376. **Reacting a Low Molecular Weight Aliphatic Ketone with a Low Molecular Weight, Unsubstituted, Saturated Aliphatic Aldehyde in a Mutual Solvent in the Presence of a Friedel-Crafts-Type Catalyst to Obtain as the Principal Reaction Product a Beta Hydroxy Carboxylic Acid Lactone.** B. F. Goodrich Co., New York, N. Y., assignee of F. E. Kung, Akron, O., both in the U. S. A.

426,401. **Reclaiming Process in Which Ground Vulcanized Rubber Waste Is Mixed with Abietic or Sylvic Acid, or Colophony, or Coumarone, or Copal or Materials Containing Them, and Agitating the Mixture at a Temperature between 100° and 140°C.** Rubber & Plastics Compound Co., Inc., New York, N. Y., assignee of Sudamericana de Patentes, S.A., Panama City, Panama, assignee of A. Treves, New York, N. Y., U. S. A.

426,411. **Processing Rubber Waste by Grinding, Mixing with Abietic or Sylvic Acid, or Colophony, or Coumarone, or Copal, or Materials Containing Them, and Agitating the Mixture at a Temperature between 140° and 180° C.** Sudamericana de Patentes, S.A., Panama City, Panama, assignee of A. Treves, New York, N. Y., U. S. A.

426,457. **Treating Alginic Material with Sulphuric Acid and Heating to about 150° to Obtain a Resin Substantially Insoluble in Water and Having Cationic and Color Absorption Properties.** R. Boyd, Vancouver, B. C.

426,501. **Aqueous Dispersion of Solid Ethylene Polymer.** Canadian Industries, Ltd., Montreal, P. Q., assignee of A. M. Alvarado and G. L. Dorough, both of Wilmington, Del., U. S. A.

MACHINERY

United States

2,372,644. **Tire Mold.** T. P. Bacon, Oakland, Calif.

2,372,737. **Tool for Welding Two Sheets of Thermoplastic Material together.** W. M. Phillips, Jr., assignor to Udylite Corp., both of Detroit, Mich.

2,372,755. **Impregnating Apparatus.** W. P. Abell, Quincy, Mass., assignor to United Shoe Machinery Corp., Flemington, N. J.

2,373,091. **Machine for Weaving Insulating Materials.** W. F. Astley, Cicero, assignor to Union Asbestos & Rubber Co., Chicago, both in Ill.

2,373,167. **Extruder.** G. L. Cherry, Western Springs, and C. C. Veale, Wheaton, both in Ill., assignors to Western Electric Co., Inc., New York, N. Y.

2,373,215. **Apparatus for Treating a Film of Thermoplastic Material.** H. L. Young, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,373,354. **Tire Building Machine.** F. S. Sternrad, Cuyahoga Falls, and J. P. Sapp, Kent, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

2,373,769. **Tire Repairing Device.** C. W. Macy, Pasadena, Calif.

2,373,816. **Continuous Vulcanizer.** D. R. De Roche, Baltimore, and D. P. Jones, Towson, both in Md., assignors to Western Electric Co., Inc., New York, N. Y.

2,373,939. **Apparatus for Preparing Plastic Material for Final Shaping or Molding.** J. Bailey, West Hartford, assignor to Plax Corp., Hartford, both in Conn.

2,373,975. **Machine for Stripping Tires from Rims.** J. S. Plumeau, Bellaire, L. I., and C. C. Ottoson, West Brighton, S. I., both in N. Y.

2,374,099. **Tire Vulcanizing Press.** C. Iverson, assignor to National Rubber Machinery Co., both of Akron, O.

2,374,233. **Frame Mold for Use between a Pair of Platens in a Press in a Process of Expanding Material within a Confined Area.** H. Pfleumer, New Brunswick, N. J., assignor to Rubatex Products, Inc., New York, N. Y.

2,374,391. **Tire Builder.** F. S. Sternrad, Cuyahoga Falls, and J. P. Sapp, Kent, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

2,374,468. **Injection Molding Apparatus.** F. von Opel, New York, N. Y., vested in the Alien Property Custodian.

Dominion of Canada

426,403. **Device for Forming Beads on Thin Rubber Articles.** Julius Schmid, Inc., New York, N. Y., assignee of Y. H. Kurkjian, Hawthorne, N. J., both in the U. S. A.

464,404. **Apparatus for Stamping and Printing Rubber Goods.** Julius Schmid, Inc., New York, N. Y., assignee of Y. H. Kurkjian, Clifton, N. J., both in the U. S. A.

426,519. **Die for Use in Forming a Thermoplastic Sheet.** Canadian Industries, Ltd., Montreal, P. Q., assignee of R. E. Leary, Newark, N. J., U. S. A.

426,546. **Device for Stretching Rubber and Other Flexible Tubing.** Hellermann Electric Ltd., Oxford, assignee of A. C. Anselmi, Oxfordshire, both in England.

426,998. **Extrusion Apparatus.** Canadian Industries, Ltd., Montreal, P. Q., assignee of C. R. Johnson, Glenn Mills, Pa., and R. R. Nydegger, Wilmington, Del., both in the U. S. A.

427,001. **Extrusion Device.** Canadian Industries, Ltd., Montreal, P. Q., assignee of M. H. English, Pompton Lakes, N. J., E. R. Jones, Philadelphia, Pa., and R. R. Nydegger, Wilmington, Del., all in the U. S. A.

427,050. **Machine for Applying Spots to Caps of Bottles.** Peters Bros. Rubber Co., Inc., assignee of C. S. Jackson, both of Brooklyn, A. C. Parlini, Freeport, both in N. Y., and E. Hascher, Newark, N. J., all in the U. S. A.

UNCLASSIFIED

United States

2,372,828. **Anti-Slip Device for Overshoes.** C. Harvey, Canastota, N. Y.

2,373,833. **Cable Clamp.** F. E. Johnson, Malden, Mass., assignor to United-Carr Fastener Corp., Cambridge, Mass.

2,373,868. **Cable Slitter.** W. A. Wilson, assignor of one-half to I. H. Wilson, both of New Orleans, La.

2,374,141. **Hose Clamp.** V. E. Sprouse, Columbus, Ind.

2,374,211. **Wire and Cable Stripping Machine.** J. P. Kane, Charleston, S. C.

2,374,224-2,374,226. **Flexible Hose Coupling.** W. A. Melsom, assignor to Bowden (Engineers), Ltd., both of London, England.

2,374,355. **Non-Skid Tire Chain.** D. S. Kennedy, Longparish, Andover, England.

2,374,616. **Tire Chain Repairing Device for a Ram's Horn Link Chain.** N. C. Oddo, Middletown, N. Y.

Dominion of Canada

426,469. **Wheel Structure.** G. A. Lyon, Allenhurst, N. J., U. S. A.

426,474. **Surgical Glove Sterilizer.** G. E. Richards, Toronto, Ont.

426,564. **Wrapper for Tubular Rubber Goods.** Julius Schmid, Inc., assignee of C. J. Schmid, both of New York, N. Y., U. S. A.

426,589. **Inner Tube Balancing Device.** Wingfoot Corp., assignee of J. Torrey, Jr., both of Akron, O., U. S. A.

426,590. **Tire Bead Lock Ring and Assembly.** Wingfoot Corp., assignee of C. E. Zarth, both of Akron, O., U. S. A.

426,591. **Ultra-Sonic Testing Apparatus.** Wingfoot Corp., assignee of W. E. Morris, both of Akron, O., U. S. A.

TRADE MARKS

United States

411,799. **Continex.** Carbon black. Continental Carbon Co., New York, N. Y.

411,800. **Knight.** Carbon black. Continental Carbon Co., New York, N. Y.

411,805. **Glos-Tex.** Shoe fabrics. A. Swartz, doing business as Atlantic Rubber Products Co., Boston, Mass.

411,848. **Rayocable.** Tires. Goodyear Tire & Rubber Co., Akron, O.

411,908. Representation of a label containing the words **"Franklin Simon."** Wearing apparel. Franklin Simon & Co., Inc., New York, N. Y.

411,943. **Dyna-Mold.** Air hose. Raybestos-Manhattan, Inc., Passaic, N. J.

411,967. **Par.** Athletic supporters. Kendall Co., Walpole, Mass.

412,106. **"Bub" Duribilknit.** Athletic supporters. John B. Flaherty Co., Inc., New York, N. Y.

412,021. **Butex.** Compounding ingredient for rubber and synthetic rubber. Firestone Tire & Rubber Co., Akron, O.

412,026. Representation of a knight in armor looking through a microscope. Wrinkle-finish compositions. Roxalin Flexibel Finishes, Inc., Elizabeth, N. J.

412,033. **"Ubapol."** Cement. Union-Baystate Co., Inc., Cambridge, Mass.

412,041. Representation of blocks with the words: **"Kidi Kin"** across them. Children's apparel. Marlan Co., Philadelphia, Pa.

412,106. **Veloform.** Plastic and synthetic resin molding powders. Firestone Tire & Rubber Co., Akron, O.

412,108. Representation of a fish. Moistening devices for gummed surfaces. E. W. Pike, doing business as E. W. Pike & Co., Elizabeth, N. J.

412,156. **Cyclocure.** Accelerators. Monsanto Chemical Co., St. Louis, Mo.

412,170. **Plasto-Pak.** Liquid plastic composition that forms a rubber-like protective film. Standard Varnish Works, Staten Island, N. Y.

412,228. Representation of a label containing the letters: **"JRC."** Printing rollers. Ideal Roller & Mfg. Co., Chicago, Ill.

412,234. **Plastiphane.** Liquid plastic which forms a rubber-like coating. Col-Mac Co., Westbury, Long Island, N. Y.

412,240. **Moortite.** Synthetic rubber gaskets. Technical Coatings, Inc., Los Angeles, Calif.

412,264. **Plotherm.** Aircraft deicing and industrial heating. Goodyear Tire & Rubber Co., Akron, O.

412,343. **Rawlings.** Sporting goods. Rawlings Mfg. Co., St. Louis, Mo.

412,352. **No Wrinkle.** Medical appliances. Elizabeth Arden Sales Corp., New York, N. Y.

411,484. Representation of a ball with wings and the words: **"Preferred"** at the top and **"Quality"** on the bottom, with the words: **"Peerless Brand"** on the wings. Sporting equipment. H. N. Ullman, Brooklyn, N. Y.

411,606. **Roxalin.** Compounds for coatings and penetrants. Roxalin Flexible Finishes, Inc., Elizabeth, N. J.

411,635. **Purtone.** Raw or partly prepared materials. Continental Carbon Co., New York, N. Y.

411,639. **"Gates Steelcable."** Cable. Gates Rubber Co., Denver, Colo.

411,652. **"Golden State."** Hose, belting, etc. Pioneer Rubber Mills, San Francisco, Calif.

411,697. **Up-Sweep.** Foundation garments. A. Brown, doing business as Triumph Foundations Co., New York, N. Y.

SUN PROCESS OILS . . .

Eliminate Pigmenting Troubles, Blooming, Excess Shrinkage

To meet the critical standards of hospitals in all parts of the country, a maker of white GR-S rubber sheeting uses Sun Circo light and Circosol 2XH as processing oils. After two years, the company chemist reports:

No discoloration of sheeting, due to pigmentation and a minimum of shrinkage. There has been no blooming, either.

High compatibility with GR-S is a characteristic of Sun oils, and they are neutral in curing, thus eliminating the need for adjustments of sulphur and accelerators.

Proper softness of GR-S stock is produced in the uncured state with full allowance for high resilience in the finished vulcanizate.

To meet the technical requirements of the rubber industry, Sun makes a number of special processing oils and lubricants. In almost all major industrial centers, Sun Engineers, trained in the correct application of these products, are available to consult with you. For further information, call your local Sun Engineer, or write to . . .

SUN OIL COMPANY · ***Philadelphia 3, Pa.***

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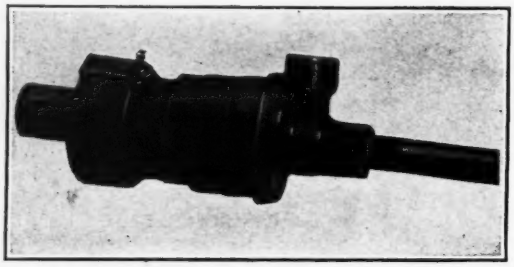


DIAMOND REVOLVING JOINTS . . .

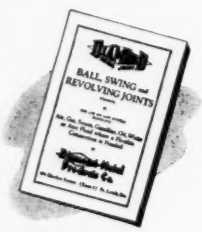
—for rubber mills or mixers, and for every kind of steam-heated and water-cooled roll in rubber plants and other industries. Patented construction prevents leaking. Molded gasket lasts 14 months on average in severe service—easy, quick and cheap to replace—no tight packing to act as brake on roll.

JUST ONE JOINT TO A ROLL, leaving one end clear of pipes. Steam enters and condensate drains out through same joint. Correctly engineered—sturdily constructed.

THE PROOF—

"Several months ago we decided to replace packing-type joints on two rubber mills to do away with constant repacking and clogging of steam traps and strainers with macerated packing. We cleaned out all this fibrous material, then installed Diamond Revolving Joints, and have not found it necessary to clean a trap or strainer since. We like them so well we have ordered two new rubber mills to come equipped with Diamond Joints."
ELECTRONIC RUBBER CO., Stamford, Conn.

Diamond Revolving Joints are manufactured in four types, as follows: Type RO-1—1" roll connection, ½" steam and ⅜" syphon connection. Type RO 4-A—1¼" roll connection, 1" steam and ½" syphon connection. Type RO 5—2" roll, 1¼" steam and ¾" syphon connection. Type RO 6—2½" roll, 1½" steam and 1½" syphon connection. All types shipped from stock for immediate delivery.



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PRODUCTS COMPANY
MANUFACTURERS OF SWING JOINTS
A Type For Every Purpose
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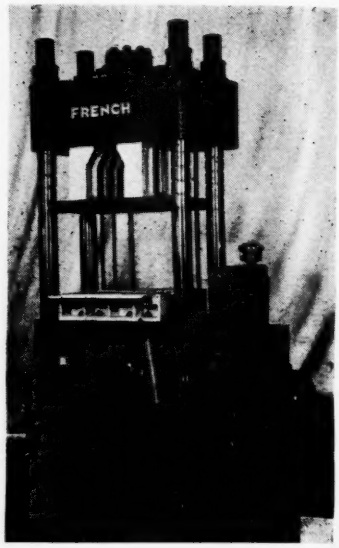
New Machines and Appliances

New Plastic Molding Press

A NEW molding press, each unit complete with a fully automatic cycle controller covering various types of molding, has been put on the market. It is a self-contained unit with hydraulic pumping equipment built into the machine bed. A feature of the press is its fast action and its utility in connection with high-frequency pre-heating units for maximum production speeds. The idle closing speed is 300 inches a minute. The 100-ton press is powered by a 5 h.p. motor, and the 200-ton press by a 7½ h.p. motor. The machine is a compression and transfer molding combination. The French Oil Mill Machinery Co., Piqua, O.



Newly Designed Molding Press

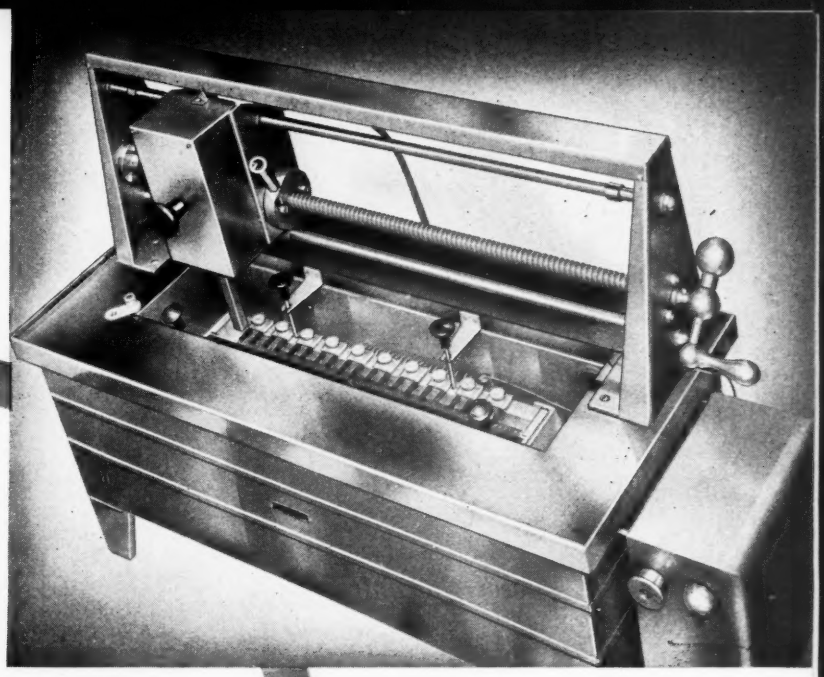
Taber Abraser

APPLICABLE for testing dry or wet specimens, a new abraser, Taber research model, has been introduced together with a testing set, specimen table for running tests either in dry or moist conditions, and all accessories. This abraser is used for determining the wear or abrasion resistance of practically every material which is subject to surface abrasion. Rubber is one of the many materials on which abrasion resistance tests provide data of value to manufacturers.

There are about five operations in running an abrasion test with any material: sample is placed on holder, if plate specimens are needed, bank plates are provided ready for coating with sample material; before each test is started, the testing wheel surfaces are refaced by running briefly against an abrasive disk; then the refacing table is removed, and the specimen holder mounted on

REMOVE THE NERVE WITH PHILBLACK A

(FOR FURTHER DETAILS, SEE AD ON PAGE 256)



"Precision" Du Pont Brittleness Tester

Solves your problem of determining the brittleness of rubber and elastomerics at sub-zero temperatures.

In determining the brittleness of elastomeric compounds, particularly in the new synthetics, which are extremely sensitive to temperature, it has been found necessary to make tests at sub-zero temperatures.

The new Precision-Du Pont apparatus was designed to conduct brittleness tests in the shortest possible time and in the most convenient manner.

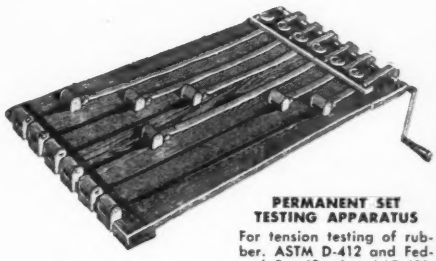
Twenty specimens can be successively tested in about one minute after conditioning. The solenoid travels on a carriage which is actuated by a hand-operated worm gear. It is not necessary to index the specimens and make twenty separate contacts. Tests can be started at any specific temperature and impact tests made in decrements of every five degrees. The impact is obtained by simply pressing the switch button which completes the circuit, thus actuating the solenoid which delivers the blow to the specimen.

The approximate outside dimensions are 30" x 13" x 14" high, the tank containing the immersion medium is 23" x 6" x 6". All metal parts on outside of apparatus are either stainless steel or chrome plated; the tank is of tinned copper. It is insulated with 3" cork throughout.

The cold bath is not supplied with this apparatus but can be obtained in a console floor model which is cooled by dry ice to a temperature of −100°F.

Complete details upon request. Write for new Rubber and Plastics Catalog No. 1000.

A FEW OF THE MANY OTHER "PRECISION" ITEMS FOR YOUR LABORATORY.

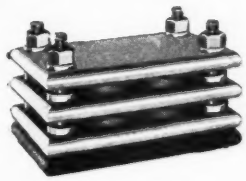


PERMANENT SET TESTING APPARATUS

For tension testing of rubber. ASTM D-412 and Federal Specification AAR-601. Holds 6 samples. Individual clutches for each sample.

COMPRESSION SET TESTER ASTM D-395 METHOD B

Holds 8 specimens. Bench plate makes this apparatus extremely easy to handle. The usual spacers are replaced with washers which cannot become lost.



COMPRESSION FATIGUE CELLS

Used to confine rubber under compression for long periods during which time compression fatigue is measured by observing the decrease in the pressure exerted by the sample.

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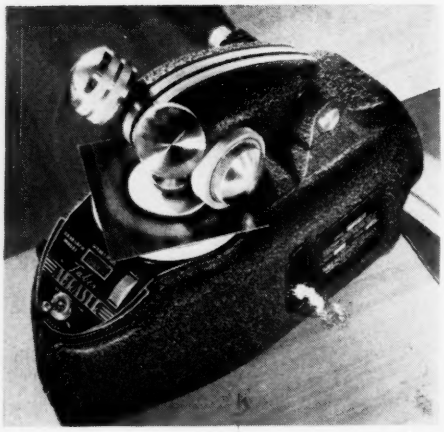
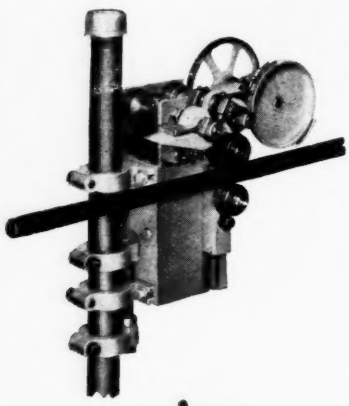


Taber Surface Wear Tester

the driving shaft at which time the abrading wheels are lowered into testing position; and, finally, the cycle counter is set to zero, and the motor started. The specimens being tested are rotated between 60-70 r.p.m. The results of tests are reported either as the number of "wear cycles" or as "loss in weight." Taber Instrument Corp., 111 Goundry St., North Tonawanda, N. Y.



Automatic Marker

New Automatic Marking Unit

BAR, tube stock, and extruded shapes can now be printed automatically by means of a new marker recently introduced. It is a motor - driven, floor mounted unit, which can print stock in continuous lengths or cut-off sections. The lineal velocity is up to 240 feet a minute. The six-inch diameter printing head permits a maximum length of copy of about 18 inches. Width of copy does not exceed a total of 30 degrees on each side of the vertical center line or tubular stock. The rubber type or dies are automatically inked for each printing. The Superior Type Co.

"Care and Use of Synthetic Rubber Tires." Office of Defense Transportation, Washington 25, D. C., 16 pages. 10¢. In addition to various government and tire manufacturer's tests, which are discussed in some detail, the publication lists the main differences between synthetic and natural rubber tires and discusses good operating practices for new synthetic rubber tires. A synthetic tire should be "broken in"; that is, it should be used for small loads at first so that the casing can stretch or grow gradually. Because of the difference in adhesive characteristics in natural and synthetic rubbers while hot, it is emphasized that more care must be given to synthetic tires in this respect. Tires should not be underinflated as this condition causes excessive flexing of tire casings, and overinflation causes extreme tread wear. Another important topic covered is an explanation of "how to check tires by the comparative airloss system"; five steps or precautions are listed.

"Tire and Tube Repair Materials." E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. BL-189. 2 pages. A compound designed to meet WPB R-1 requirements for a repair cushion stock is described. Parts by weight and percentage by volume are given.

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EUROPE

GREAT BRITAIN

Rubber Control Lessened

The control of rubber is gradually being relaxed, and at present there are in force only three Ministry of Supply Orders under the title of Control of Rubber: the No. 21 Order prohibiting and restricting production of various kinds of articles containing rubber; the No. 23 order, fixing maximum prices for waste and reclaim rubber and regulating the production of reclaim; and a new order, No. 24, which replaces several earlier orders governing the acquisition, disposal, and consumption of natural and synthetic rubber, latex, gutta percha, and balata. The principal changes under the new order are: (1) Prices of liquid latex are no longer statutorily controlled; the definition now excludes "compounded or processed latex." (2) Trimmings, strippings, and dust of rubber, etc., are decontrolled. (3) "Thiokol" is omitted from the definition of "synthetic rubber." (4) The Orders Nos. 4, 7, 17, and 19, which regulated the production of rubber footwear and rubber hose, are revoked; necessary regulation of the use of rubber in the production of footwear or hose will be exercised by the licensing system under the present order.

Prices for Liquid Latex

Revised prices for liquid latex from Rubber Control stocks were announced by the Ministry of Supply (Rubber Control) and went into effect on March 1. The new prices are shown below.

	Price as from March 1, 1945, per gallon	
	s.	d.
(1) Natural Rubber Latex		
Latex at concentrations of less than 45%	8	0
Latex at concentrations of 45% and up, imported prior to December, 1942	11	6
Latex at concentrations of 45% and up, imported after December 31, 1942	13	6
(2) Synthetic Rubber Latex		
GR-S Types 1 and 2 (concentrations of about 26.5%)	7	8
GR-S Type 3 (concentrations of about 38%)	10	0
(iii) Neoprene Type 571 (concentrations of about 50%)	16	0

Old, Usable Tires Discussed

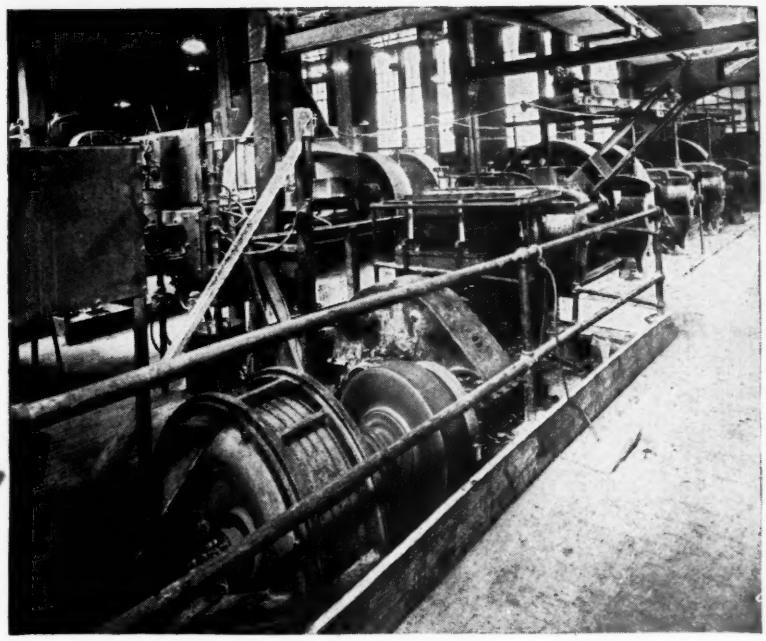
The subject of old tires on Ministry of Supply dumps was discussed in the House of Commons on February 28, when a member pointed out that there were now on these dumps about 5,000,000 tires, 8% of which were fit for retreading, and he wished to know why nothing was done about salvaging these usable tires. The Minister of Supply, Sir Andrew Duncan, replied that not more than 3% were really fit for reuse and that they would not be worth the amount of labor needed to pick them out. He further explained that before old tires were sent to the dumps, they were inspected, and all usable tires set aside for repairing or retreading. The collections of old tires were originally intended to meet the demand for reclaim, but the arrivals of synthetic rubber had reduced the need of reclaim, and under present conditions the uses to which reclaim could be put were strictly limited in any case. When normal activities were resumed, he added, the tires would form a valuable stock for reclaimed rubber.

In answer to a question, the Minister of Supply admitted that the quality of tires at present was somewhat below the prewar standards, but stated that the best possible use was being made of available materials.

A member remarked that retreaded tires now gave very unsatisfactory results and that a life of only 1,000 miles was all that was found possible in practice.

While these discussions were going on in the House of Commons, the Tire Casing Collectors' Association was holding its annual meeting, and the question of supplying liberated countries with old, usable tires was dealt with. It developed that the French authorities had already sent an inquiry regarding the kind and quantity of casings the members of the Association were in a position to offer for shipment. The meeting then took up the question of Ministry of Supply dumps. Casing collectors through the Association's secretary had requested Lord Rothes, tire director, to be permitted access to these dumps to obtain tires which,

HOW *"Riding Comfort"*



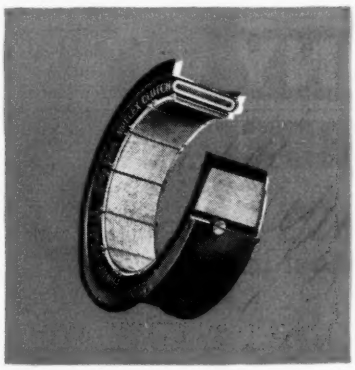
Saves Money in Milling

All heavy machines are more efficient and cost less to run when they are free from clutch troubles.

The Fawick Airflex Clutch gives them new smoothness, new freedom from vibration, by operating through a cushion of air and rubber, as effective as the cushion of air and rubber that gives the motor vehicle comfort and longer life.

With this clutch, no springs, arms or toggles are needed. There are no adjustments to make—no lubrication required. Maintenance costs are low. Even misalignment is corrected automatically.

By controlling inflation, clutch engagement is as light or as firm as the job demands. And there is complete nonmetallic safety for both drive and driven members.



Let our engineering department give you the benefit of their broad experience in the form of definite recommendations for your machines.

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The Fawick Clutch provides air-cushion clutch action because it matches today's fine motor vehicle tires in quality of materials and excellence of workmanship—the result of the great technical advances made by America's Rubber Industry.

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though they might not be considered fit for use under the Tire Rationing Scheme, might still be very acceptable to the French authorities. But Lord Rothes had replied that the War Office was already looking over certain dumps with the same end in view; that the matter was purely a military problem, between government departments, and that no question of general disposal of material on the dumps was involved.

New Rubber Footwear Regulations

A recent order issued by the Board of Trade came into operation on March 26 and changes the regulations governing the supply of rubber footwear in two respects. First all second-hand rubber boots, reconditioned government surplus rubber boots, and rubber ankle boots may be sold without permit. Then, under General License, the number of coupons required for all second-hand and reconditioned government surplus rubber boots will be reduced to three for adults' sizes and to two for children's sizes. These ratings apply only when the boots are sold at prices above those laid down for coupon-free sales.

The small British production of children's Wellingtons will be supplemented by limited quantities imported from Canada. The Canadian Wellingtons are to be in all sizes up to and including boys' size 5; they will be free of purchase tax and will be obtainable for three coupons.

These imports, though adding to the available supply of this type of footwear, will not permit general distribution for some time to come. Hence special arrangements have been made by the Board of Trade to insure that children in rural areas, who have to walk over fields and unpaved roads, will be supplied first. It is expected that the trade generally will assist in voluntary measures to attain this end, for it is not intended to impose rigid control by means of permits. Retailers will therefore be authorized to refuse to sell children's Wellingtons, either of Canadian or British manufacture, unless they are sure the purchases are intended for children living in places with a population under 3,000. As an additional precautionary step, importers and manufacturers have been asked not to supply retailers in towns of 50,000 inhabitants or more.

British Rubber Industry Notes

Recent visitors to the United States were R. J. Farrier and F. Goldsmith, of P. B. Cow & Co., Ltd., Streatham Common, London. The purpose of the visit was to examine methods of layout and plant, inspect new equipment, and investigate sources of specialized raw materials in the plastic and rubber field.

Synthetic rubber golf balls brought back from the United States by Sir John Hay, chairman of Guthrie's and member of the International Rubber Regulation Committee, are to be tested by the famous golf player, James Braid, who won his first championship in 1901 with the old Gutty ball.

Mixed results have been obtained with experiments in growing *kok-saghyz* in Scotland, carried out by the West of Scotland Agricultural College last year, with seed supplied by Kew. When seed was vernalized for 14 days in a refrigerator at 32° F., the average rate of germination was 72%, as compared with 26% for the untreated control. The most satisfactory trials were at Girvan and in the Clyde Valley; germination was also obtained at 500 feet in Perthshire, and good results at Auchincruive, Milngavie, and certain other centers. But tests at Stranraer, Oban, and Taynuilt showed almost no results. It is to be noted that in all these tests far more damage was done to early seedlings and mature plants by slugs than by frost.

GERMANY

Determining Chlorine Content in Vinyl Polymerizates

While the German Chemical Society has adopted the classic Carius method as the only one suitable for determining chlorine content in vinyl chloride polymerizates because of its absolute reliability, H. Hofmeier and W. Schroeder[1] searched for a less troublesome method for use in group investigations in which simple laboratory apparatus could be employed and which could safely be applied by trained assistants.

Tests showed that chlorine-containing synthetics alone or

[1] *Kunststoffe*, 34, 5, 104 (1944).

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Trenton, N. J.

mixed with other substances could easily be decomposed by a wet method with concentrated sulphuric acid in the presence of nitric acid, and simple glass apparatus was developed with which to carry out the process. The apparatus consisted of a decomposition flask (Erlenmeyer) with capacity of 50 cubic centimeters with a dropping funnel closed with a stop-cock. Between the Erlenmeyer and a Kipp apparatus, from which carbonic acid was withdrawn, were connected two wash bottles holding, respectively, nitric acid-silver nitrate solution and concentrated sulphuric acid for gas purification and drying. Finally four Erlenmeyer-type receivers were connected with the Erlenmeyer in which decomposition took place.

To perform the analysis, 0.05- to 0.5-gram (according to the chlorine content) of the material was accurately weighed into the decomposition Erlenmeyer and about two grams potassium nitrate p.a.[2] added. Then Erlenmeyer and receivers were connected, each of the latter containing about 20 cubic centimeters of N/20-silver nitrate solution and a few drops of nitric acid; all receivers were covered as protection against light. Next 20 to 30 cubic centimeters sulphuric acid 1.84 p.a.[2] were put into the dropping funnel, which was connected with the Kipp apparatus, and the sulphuric acid passed into the Erlenmeyer with the aid of carbon dioxide. Then a slow stream of carbon dioxide was started and the Erlenmeyer heated until complete decomposition of the substance was achieved. At times during the process small particles of the chlorine-containing sample mounted high up against the walls of the flask, and to decompose these, too, a few additional cubic centimeters of hot sulphuric acid were introduced via the dropping funnel. After the fluid in the Erlenmeyer, which was dark when decomposition began, became light again, heating continued for another 20 to 30 minutes in a somewhat stronger stream of carbon dioxide. The silver chloride separated in the receiving flasks was then filtered, dried, and weighed in the usual manner.

This method was tested on polyvinyl chloride in the form of masses, foils, and powder; best results were obtained on the masses, where the difference as compared with the values found according to the Carius process was only about 0.2%. The differences in the case of foils, 0.5%, and on powder, 0.2 to 0.4%, were considered quite permissible for industrial investigations, though too high for scientific work.

[2] Probably means "pure analysis" similar to "c.p."

Structure of Fiber-Forming Synthetic High Polymers

On the basis of the arrangement of the atoms in the molecule and the state of intramolecular linkage, the fiber-forming high polymers are divided into (a) polymeric hydrocarbons and their derivatives as well as the polymerous ethers (e.g., polystyrol, polyvinyl chloride, polyethylene oxide, etc.), and (b) mesomeric chain polymers in which mesomeric groups (e.g., amides, esters, ureas, etc.) help build up the main chain. The investigators[1] suggest for the intermediate state of the mesomeric groups the concept "Meta-Zwitterion" (meta-hybrid-ion). The formula for the chemical constitution permits the reading of the distribution of the charge and (while allowing for steric relationships) the drawing of conclusions on the state of intermolecular linkages.

In the case of polymers of group (a), undirected dispersion forces are active between the individual links of the chains to neighboring thread molecules and lead to the formation of wadding-like structures. In the case of mesomeric chain polymers of group (b), however, the action of directed dipole forces causes a micellar structure with distinctly autonomous arrangement. The linkage situation between different mesomeric groups is designated by the authors as "Meta-ion-relation," by which is brought out that the forces which here appear lie between the heteropolar main valence forces and the normal dipole forces. The similarity of the physical properties of the different mesomeric chain polymers, which, for instance, also appears in the colloid structure common to all, is due to the meta-ion-relation, that is, the similar chemical constitution common to all.

The authors do not approve of the extension of the expression "hydrogen-linkage" to intermolecular mesomerism; they consider it more correct to use the term "meta-ion-relation" (with indication of intermolecular mesomerism, if necessary) in those cases also where the chemical formula shows the intermolecular mesomerism meta-ion-relation hydrogen-linkage is possible.

[1] W. Broser, K. Goldstein, and H. E. Kruger, *Kolloid-Z.*, 105, 2, 131 (1943).

Polymerization of Indene

During recent investigations on indene, J. W. Breitenbach and G. Bremer[1] found that heat polymerization of indene differs

[1] *Ber. Deutsch Chem. Ges.*, 76, 1124 (1943).

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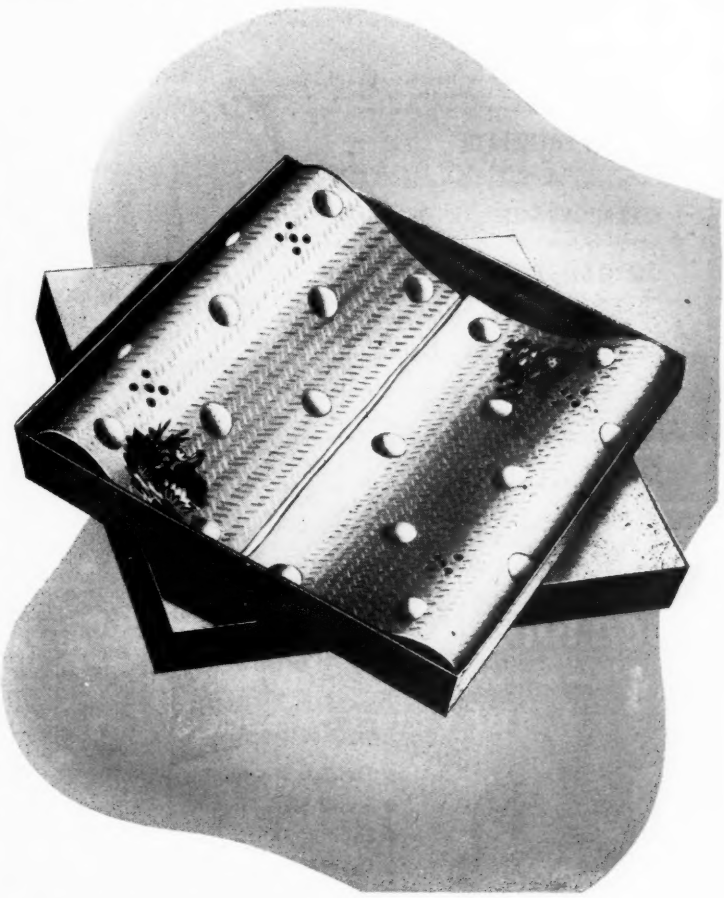

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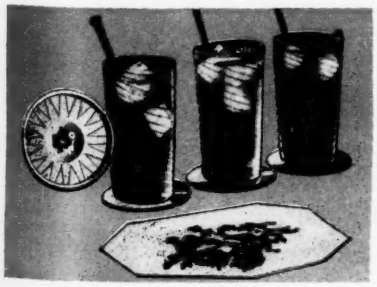

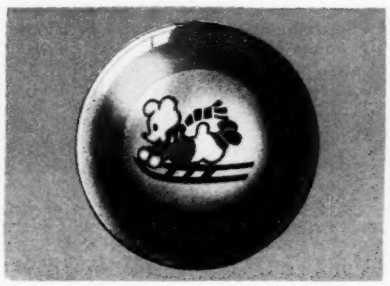

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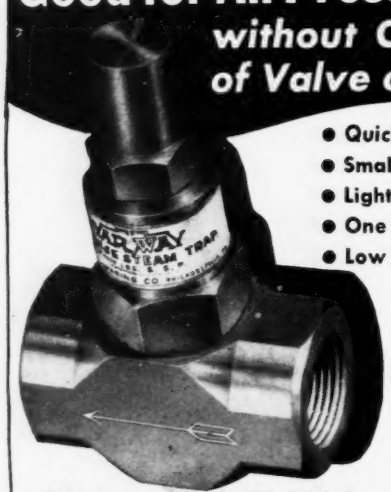

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all counts from that of styrene—it is very slow, yields very low-molecular products, and the average molecular weight of the polymerizates depends very little on the temperature of polymerization. The investigators, therefore, assumed that the mechanism of indene polymerization proceeded along the lines of addition polymerization. They found that polymerization of indene could be excited by peroxide and saw in this fact an indication that a chain reaction was involved. The initial speed corresponded to that of styrene, but the ratio of the rate of growth and of break-down which determines the intermediate degree of polymerization was considerably smaller. The experiments on the influence of peroxide on indene polymerization allowed a connection to be found between the acceleration of polymerization of indene by peroxide and the thermal decomposition of peroxide in saturated hydrocarbons. In the reaction with saturated hydrocarbons the primary effect, they said, must be interpreted as an activation of the hydrocarbon by the peroxide, actually activation of a CH bond. The activated CH bond can react with a peroxide molecule; in the presence of suitable CC double-bonds it can induce polymerization-chain reactions, and finally it can also react with other suitable substances, such as quinones, for instance.

Magazines Suspended

News has been received that manpower demands of the Armed Forces and for the armament drive have forced two well-known German rubber papers to stop publication for the duration. These periodicals are the *Gummi-Zeitung* and *Kautschuk* which some time ago combined as a single, bi-monthly publication. The issue of September-October, 1944, was the last to appear.

EUROPEAN NOTES

In liberated Holland, a Washington report says, wealth is not measured in money, but in goods which can be bartered. Among the most highly prized possessions are bicycles equipped with tires and tubes. Bicycles are in great demand, anyway, but whereas an excellent bicycle without tires brings in a mere 100 guilders, a bicycle in good repair, and with fair tires, will get as much as 1,200 guilders ($640).

The Skanska Attiksfabriken A/B (Skane Vinegarworks) manufactures several Bakelite-type resins, of which the most important are Isolit, a phenol resin, and Isopal, a carbamide resin. The formalin and phenol employed as base materials are made in the company's hardwood distillation plant. At an industrial exhibition in Stockholm, the company displayed various articles made with these resins, including gears and bearings made from Isolit combined with shredded fabric and intended for use where high resistance is required, as well as tubes and other bearings formed under pressure from laminations of textile and resin. Among the latter type of bearing was a water-lubricated bearing 15 inches in diameter, designed for use in a steel mill. Besides Isolit and Isopal, the company also showed Isofol, a pressed resin and veneer product, and Isolon, similar in appearance and physical properties to amber. Costume jewelry, handles, knobs, billiard balls, and similar goods are formed from the Isolon by a casting process.

AFRICA

In the attempt to add as much as possible to the output of natural rubber, Malayan rubber experts were commissioned to aid in finding rubber plantings in Tanganyika, started by the Germans before 1914 and subsequently abandoned. Progress in rehabilitating these areas is reported, and outputs in 1942 were at the rate of 1,000 tons a year. Rubber production in the Cameroons is also said to have been considerably increased in recent years. Unfortunately, as in the case of Tanganyika, the latest available figures are for 1942, when more than 1,000 tons of rubber were collected.

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Editor's Book Table

NEW PUBLICATIONS

"The Carbon Reenforcement of Neoprene GN." Columbian Colloidal Carbons Vol. VI, No. 1. Columbian Carbon Co., 41 E. 42nd St., New York, N. Y. 86 pages. This comprehensive booklet contains five sections devoted in turn to comparison with published data, the effect of carbon loading and grade on Neoprene GN, the three basic properties of carbon and their effect on Neoprene GN, rubber property correlations, and lower modulus in Neoprene GN. The data are presented in both tabular and graphical form, and, as stated in the summary and conclusions, the reenforcement of neoprene with colloidal carbon is of particular interest because together with Butyl rubber, neoprene enjoys an advantage over other commercial synthetics in having a pure gum tensile and elongation comparable to that of the natural product and also since its place in the postwar rubber picture seems assured.

The effect of three basic carbon properties: pH, specific surface, and structure on Neoprene GN, are reviewed, and it is stated that in general pH has no discernible effect on the curing rate; carbon surface has a dominating effect, and carbon network structures assume relatively less importance since this polymer acts as a flocculating agent for most all carbon blacks and fillers. Several methods of obtaining desirable low-modulus neoprene compounds are discussed, and the method of replacing accelerators with retarders is recommended, particularly for the curing of massive articles.

"Built by Biggs." Bulletin No. 45. The Biggs Boiler Works Co., Akron 5, O. 8 pages. This profusely illustrated bulletin shows examples of both special and standard horizontal and vertical vulcanizers and devulcanizers manufactured for the rubber industry, as well as tire curing presses and latex storage tanks. The advantages of the special welding procedure of this company for pressure vessels is emphasized. Included also are examples of equipment built for the synthetic rubber plants and plastic process such as bag molding of plastic bonded fabrics, metals, or molded plywood.

"Hercules Chemist." No. 14, March, 1945. Hercules Powder Co., Wilmington 99, Del. Subjects covered in this issue of the *Hercules Chemist* are: nitrocellulose lacquers with high solids, Hercules clorafins, pine oils, and glycol ester resins. There is also a section on recent developments from Hercules, which includes mention of the use of Staybelite Ester No. 10 for providing tackifying properties to neoprene adhesives and the use of Dresinol resin emulsions for synthetic latex and adhesive compositions. Many tables of technical data are contained in the different sections.

"F-B Notes." April, 1945. Farrel-Birmingham Co., Inc., Ansonia, Conn. 24 pages. This issue contains illustrated steps in the production of a tire from the point where the crude rubber is received to the point where the tire is molded and vulcanized. An article by D. A. Comes on synthetic rubber concerns itself with a contemporary history of this material and its postwar prospects.

"Esso Oilways." May, 1945. Standard Oil Co. of New Jersey, 26 Broadway, New York 4, N. Y. 24 pages. This issue of *Oilways* is of particular interest as it discusses new rubber plasticizers: Mentor 25, Nuso 55, Coray 230, and Coblax 1000. Mentor 25 is particularly useful in reducing the energy requirements for mastication, especially in the field of molded mechanicals such as footwear, heels, and soles. Nuso 55 is recommended as a general processing oil for replacement rubbers and for neoprene. The footwear, molded mechanicals, and other rubber industries find Coray 230 an economical plasticizer. It is also useful as an extender for the replacement rubbers, particularly GR-S. Coblax 1000, a high-viscosity naphthenic black oil, is utilized in tape coatings and other operations where dilution must be obtained and color is no factor. Also discussed in this issue is the subject of work done with the Goodyear Footwear Corp. and the Rubber Footwear Industry Technical Committee. GR-S is not the only rubber Goodyear uses in the manufacture of footwear. When the plant receives sufficient natural rubber, it is used for certain Army, Navy, and civilian footwear.

"Buna N Synthetic Rubber; Effect of Various Compounding Ingredients in Representative Types." Booklet No. 10. R. T. Vanderbilt Co., 230 Park Ave., New York 17, N. Y. 16 pages. The merits of Buna N rubber are so well known that they are not discussed. The booklet shows how Vanderbilt materials are best used with representative types of Buna N. Tables of four curing combinations with various copolymers of the various elastomers are covered: Hycar OR-15, Hycar OR-25, Perbunan 26, Chemigum N1, Chemigum N2, Butaprene NXM, and Butaprene NL. In another section of the booklet, results are given where one copolymer was used as an example and the vulcanizing agents and loading (carbon black and mineral fillers) were varied. Tables are listed for the four curing operations with various copolymers, and a summary of data is given for each table. For Buna N, Ethyl Tuads used as a vulcanizing agent in sulphurless stocks give good tear, flex cracking, and oven aging resistance. P-33 and Thermax are used to give good tear resistance and high resilience, and Rio Resin in a sulphurless stock cured with Ethyl Tuads still further improves the elongation after heat aging.

"Steam Power Plant Planning Guide." Westinghouse Electric & Mfg. Co., Philadelphia 13, Pa. 40 pages. Part I of this booklet serves to illustrate the types of turbines and charts turbine sizes and speeds. The second part, on performance data, covers basic operating conditions and includes effect of deviation in pressures and temperatures on heat rates, regenerative feed water heating, recommended condenser sizes and dimensions, condenser friction, impeller, propeller, and axial types of circulating pumps and condensate pumps.

"Replacement of Black with Mineral Fillers in 'Thiokol' Type FA." Technical Service Bulletin No. 26. Thiokol Corp., Trenton, N. J. This two-page bulletin summarizes the characteristics of typical "Thiokol" Type FA compounds in which 22% of the black has been replaced with an equal volume of non-black fillers.

"Oil Refining . . . Engineering to New Precision Standards." The M. W. Kellogg Co., New York, N. Y. 32 pages. This fully illustrated booklet concerns itself with the development of oil refining from an elementary physical operation a generation ago to the present status as one of the major chemical industries of the war. The photographs are of wartime refinery installations, and processing diagrams are also included. The various refining processes are analyzed with a view toward their respective contributions to transport in war and peace. The report discusses the petroleum industry's contribution to the field of synthetic rubber through the production of butadiene. Also discussed are modern refining, fluid catalytic cracking, alkylation and isomerization, hydroforming (catalytic reforming), polymerization, basic processes and equipment, lubricating oil refining, combination units, and foreign installations.

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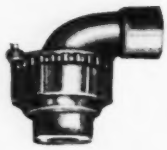

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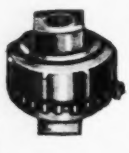

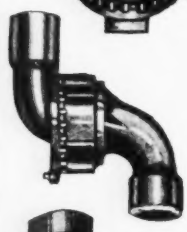

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"Taber Abraser Testing Handbook." Taber Instrument Corp., North Tonawanda, N. Y. 16 pages. A booklet intended to clarify certain aspects in the use of the Taber abraser, it covers a variety of subjects in regard to accessories available, testing operations, and abraser ratings of the material being tested. The principle of the abraser is discussed, and examples are given on how to compute wear factors. The booklet is fully illustrated.

"Distribution of Oxygen in Oxidized Rubbers." R. F. Naylor. The British Rubber Producers Research Association, Publication No. 53. This booklet reports a study of the distribution of oxygen in the various groups resulting from the secondary reactions; i.e., the initial products of the autoxidation of polyisoprenes are hydroperoxides which under normal conditions are unstable and yield a large variety of secondary oxidation products. This booklet discusses the distribution of oxygen in the different groups resulting from these reactions. Assuming that the oxidative agent is the hydroperoxide group, and that the molecule is broken in the simplest way (by the fission of a double bond to give an aldehyde and a ketone), the author discusses the products of oxidative fission, going on to prove that, stoichimetrically, four oxygen atoms, as a minimum, will be associated with every fission. Analytical methods and experimental micro-analyses are also covered in some detail, the latter with regard to the solubility and preparation of samples of the oxidized rubbers for analysis.

"Flexible Molds of Neoprene Latex." E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. BL-190. 6 pages. This leaflet was written for the purpose of informing manufacturers of proper procedure in the making of small statuary, plaques, and novelties from neoprene latex, a procedure similar to the methods used in making such molds from rubber latex. As it is necessary to compound neoprene latex before using, some typical mixtures are given in tabular form with the dry weights listed. In connection with this procedure, mold formation, mold reenforcement, and the coagulating dip method are covered. It is emphasized that this last topic is a patented process, and persons wishing to use it commercially should investigate.

"Barrett Rubber Compounding Materials." The Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. 34 pages plus an additional 24-page rubber laboratory release. The main booklet contains specifications and descriptions of 20 Barrett materials intended to help the compounder in making a selection of ingredients for specific applications. A variety of softeners ranging from liquid to solid, with the former aromatic to asphaltic in nature and the latter both bituminous and resinous in character, are covered. The booklet also contains a temperature conversion table, a specific gravity conversion table, a table of specifications and properties of coke oven light oil distillates, table of atomic weights, and a flow chart showing "Products Derived from Coal" as prepared by the Barrett Division. The rubber laboratory release includes recipes, extensive physical test data, and supplementary remarks for GR-S tire tread stock, GR-S molded and extruded stock, GR-S non-black molded (soling), and GR-S non-black molded (heel) stock.

RUBBER BIBLIOGRAPHY

The Manufacture of Rayon Tire Fabric as Practiced by American Viscose Corp. *Rayon Textile Monthly*, Feb., 1945, p. 70.

High Temperature Oven Aging of Oil-Resisting Synthetic Rubber Compounds. G. D. McCarthy, A. E. Juve, H. Boxser, M. Sanger, S. R. Doner, E. N. Cunningham, J. F. McWhorter, and R. H. Crossley, *ASTM Bulletin*, Jan., 1945, p. 33.

Vulcanizing Thermoplastics. Heat Generation in Tires. W. S. Penn, *India Rubber J.*, Mar. 3, 1945, p. 3; Mar. 10, p. 3.

Wartime Molding Aids. "BR," *India Rubber J.*, Mar. 3, 1945, p. 11.

Predicting Volume Increase of Perbunan Compounds in Petroleum Products. R. M. Howlett, *Ind. Eng. Chem.*, Mar., 1945, p. 223.

Cellulose and Cellulose Plastics. *Ind. Eng. Chem.*, Mar., 1945, p. 226.

Impact Testing of Plastics. D. R. Morey, *Ind. Eng. Chem.*, Mar., 1945, p. 255.

High-Speed Handling and Drying in the Cementing of Tire Fabric. D. M. Wilkinson and E. Heiser, *Rubber Age (N.Y.)*, Mar., 1945, p. 625.

Third Year of War Research in Mellon Institute. *Chem. Eng. News*, Mar. 25, 1945, p. 520.

Precise Method for Isolation of High Polymers. F. M. Lewis and F. R. Mayo, *Ind. Eng. Chem. (Anal. Ed.)*, Mar., 1945, p. 134.

Light and Electron Microscopy of Pigments. D. G. Brubaker, *Ind. Eng. Chem. (Anal. Ed.)*, Mar., 1945, p. 184.

Plastic Potentialities in Latin America. *India Rubber J.*, Feb. 10, 1945, p. 159.

Synthetic Organic Chemicals. *Chem. Met. Eng.*, Feb., 1945, p. 130.

Guayule Development in the United States. E. E. Scholl, *Rubber Age (N. Y.)*, Feb., 1945, p. 507.

Some Technical Aspects of Rubber Reclaiming. F. B. Menadue, *Rubber Age (N. Y.)*, Feb., 1945, p. 511.

Cell-Tite Propeller Fairings. *Rubber Age (N. Y.)*, Feb., 1945, p. 519.

Abstracts of United States Patents on the Compounding and Use of Synthetic Rubber. F. Marchionna, *Rubber Age (N. Y.)*, Feb., 1945, p. 521; Mar., p. 635; Apr., p. 73. (To be continued.)

Some Physical Properties of Elastomers at Low Temperatures. H. E. Greene and D. L. Loughborough, *J. App. Phys.*, 16, 3 (1945).

Theory of Filler Reenforcement. E. Guth, *J. App. Phys.*, 16, 20 (1945).

Control of Elongation in Highly Stretched Cotton Tire Cord. H. J. Philipp and C. M. Conrad, *J. App. Phys.*, 16, 32 (1945).

Comparison of Structures of Stretched Linear Polymers. M. L. Huggins, *J. Chem. Phys.*, 13, 37 (1945).

The Molecular Weights of Rubber and Related Materials. V. The interpretation of Molecular Weight Measurements on High Polymers. G. Gee, *Rubber Chem. Tech.*, Jan., 1945, p. 1.

The Magnetic Anisotropy of Stretched Rubber as a Function of the Tension to Which It Is Subjected. E. Cotton-Feytis, *Rubber Chem. Tech.*, Jan., 1945, p. 8.

Further Studies of the Infrared Absorption of Rubber. D. Williams and B. Dale, *Rubber Chem. Tech.*, Jan., 1945, p. 10.

The X-Ray Diagram of a Buna-S Vulcanizate. R. E. Morris and C. B. Jordan, *Rubber Chem. Tech.*, Jan., 1945, p. 20.

Reactions of Iodine, Iodine Chloride and Thiocyanogen with the Hydrocarbons of Natural Rubber and Synthetic Rubber. P. I. Medvedchuk, F. D. Aldoshin, V. P. Marovich, and A. V. Repman, *Rubber Chem. Tech.*, Jan., 1945, p. 24.

The Dependence of Damping and Dynamic Modulus on Temperatures as a Means of Evaluating the Elastic Behavior of Raw and Vulcanized Rubber. The Dynamic Resistance of Soft Rubber to Cold. H. Roelig, *Rubber Chem. Tech.*, Jan., 1945, p. 62.

What Became of the Rubber Shortage. F. B. Barton, *Nation's Business*, Apr., 1945, p. 32.

Wartime Fabric Developments of Significance to the Automotive Industry. M. Sanders, *Rayon Textile Monthly*, Mar., 1945, p. 75.

Damping, Heat Development and the Length of Life of Vulcanizates. A. Springer, *Rubber Chem. Tech.*, Jan., 1945, p. 71.

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July ..	21.73	22.61	22.78	22.83	22.90	23.04
Oct. ..	21.10	22.06	22.30	22.32	22.43	22.64
Dec. ..	20.99	21.96	22.18	22.23	22.31	22.58
Jan. ..	20.93	21.93	22.15	22.21	22.28	22.55
Mar. ..	20.87	21.88	22.08	22.10	22.17	22.57
May ..	20.76	21.82	22.02	22.00	22.09	22.45

THE spot price of 15/16-inch middling cotton of 23.15¢ on May 1 rose to 23.20¢ on May 2, held to a narrow margin to May 8, and dropped to 23.16¢ May 10. There was a steady undertone in late dealings under light mill buying of nears and scattered demand by commission houses for new crop months. The demand was supplied by the spot interests selling hedges. Reports that Senator Bankhead continues to support the idea of government purchase of cotton at parity next season influenced buying of new crop positions. The mid-April cotton parity price held unchanged at 21.45¢. Traders were disappointed.

Mid-month cotton trading was steady. Price fixing was offset by liquidation. This steadiness gave way to sluggish futures somewhat later.

Cotton on hand on April 30 was reported held as follows: In consuming establishments 2,187,916 bales of lint and 322,021 bales of linters, compared with 2,221,530 and 422,060 a year ago. In public storage and at compresses, 11,025,514 bales of lint and 39,314 of linters, contrasted with 10,272,000 and 87,557. During April, cotton spindles active numbered 22,158,674, against 22,232,168 in March and 22,411,922 in April last year.

Following the irregular price trend previously mentioned, cotton prices turned moderately firmer during the latter part of the month. Trading was rather moderate in volume during the week, and the improvement in values was attributable as much to a scarcity of offerings as to aggressiveness of demand. The spot middling price closed at 23.42c on May 31.

Fabrics

The fabrics market was marked by a record tightness in early May. The carded goods section of the gray cloth market was even tighter than usual. Sales in staple carded goods were few and far between. Actually, there are no cloth accumulations. Many consumers are still seeking to effect new contract engagements with mill interests and are restrained mainly by the reluctance of the latter to waive their caution in the direction of contracts pointed for completion several months forward.

Military demands continue heavy. Requests have been received for staple print cloths, sheetings, twills and drills, carrying AA-1 and AA-2X priorities for military uses, going unfilled for late this quarter and early the next. V-E Day brought little change in the tightness in the gray cloth market. The marketing position was not materially affected by the war news. It was thought that there would be a gradual relaxation of government controls in direct ratio to the progress of the war against Japan. Production of civilian combed goods was hit by a wave of absenteeism.

A few sales were made in the middle of the month, but the market continued tight toward the latter part of May.

Duck procurement still remains on the list of critical items for the Army. Col. Thomas W. Jones, commanding officer of the new Army Quartermaster Purchasing Office in New York, stated that plans for the Army's textile and clothing program for warfare in the Pacific and supplying of occupation troops in Europe were completed well in advance of V-E Day and were already in operation. Colonel Jones also added that buying of certain categories such as numbered duck should be less in the near future.

Because of the fact that the government has not relaxed its buying for government requirements, practically no free goods can be had for civilian raincoats. There is a great demand for civilian raincoats, but quantities are very limited.

WPB on May 8 gave manufacturers of essential textiles the same "production urgency rating" as munitions makers in a move to provide the industry with enough additional manpower to raise output 20% above 1942 levels.

New York Quotations May 23, 1945

Drills		
38-inch 2.00-yard	yd.	$0.195
50-inch 1.52-yard		.29
52-inch 1.85-yard		.23875
52-inch 2.20-yard		.20511
59-inch 1.85-yard		.25202
Ducks		
38-inch 2.00-yard S.F.	yd.	.22875
40-inch 1.45-yard S.F.		.3086
51½-inch 1.35-yard D.F.		.33875
72-inch 1.05-yard D.F.		.45476
Mechanicals		
Hose and belting	lb.	.4250
Tennis		
51½-inch 1.35-yard S.F.	yd.	.33148
51½-inch 1.60-yard D.F.		.29218
Hollands — Rubber		
20-inch	yd.	.1225/.145
30-inch		.22 /.2575
40-inch		.245 /.29
Osnaburgs		
36-inch 2.94 Cl.	yd.	.1271
40-inch 2.11 P.W.		.1623
40-inch 2.65 Cl.		.1408
40-inch 3.65 Cl.		.10946
Raincoat Fabrics		
Cotton		
Bombazine 64 x 60, 5.35	yd.	.135
Bombazine 64 x 56, 5.50		.1325
Print cloth, 38½-inch, 64 x 60		.09252
Sheeting, 40-Inch		
48 x 48, 2.50-yard	yd.	.172
64 x 68, 3.15-yard		.14761
56 x 60, 3.60-yard		.12638
44 x 40, 4.25-yard		.10352
Sheetings, 36-Inch		
48 x 44, 5.00-yard	yd.	.091
40 x 40, 6.15-yard		.07398
Tire Fabrics — Karded Peeler		
Builder		
17¼ ounce 60" 23/11 ply	lb.	.48
Chafer		
14 ounce 60" 20/8 ply	lb.	.48
9¼ ounce 60" 10/2 ply	lb.	.45
Cord Fabrics		
23/5/3, 1 1/16" cotton	lb.	.44
15/3/3, 1 1/16" cotton	lb.	.42
12/4/2, 1 1/16" cotton	lb.	.42
23/5/3, 1¼" cotton	lb.	.44
Leno Breaker		
8¼ ounce and 10¼ ounce 60"	lb.	.45

SCRAP RUBBER

DEMAND continues to soar, with somewhat brighter prospects as far as spring collections are concerned. It is expected that spring collections will bring more scrap than received in the previous months. V-E Day brought about no change in scrap materials, although it is expected that if transportation facilities were available for transporting the tires from the European theater to this country, it would do much to alleviate the relative tightness. Whole tires are becoming less available with red passenger tubes also on the decrease. Tires retreaded with GR-S caps are coming into the market in somewhat greater quantities. The consumption figures for January through March are: January, 28,700 long tons; February, 26,000 long tons; March, 28,269 long tons.

Scrap Rubber Ceilings

Inner Tubes†	¢ per Lb.
Red passenger tubes	7½
Black passenger tubes	6¼
Truck tubes	6½
Tires‡	$ per Short Ton
Mixed passenger tires	20.00
Beadless passenger tires	26.00
Mixed truck tires	20.00
Solid tires	36.00
Peelings†	
No. 1 peelings	52.25
2 peelings	33.00
No. 1 light colored (zinc) carcass	57.75
Miscellaneous Items*	
Air brake hose	25.00
Miscellaneous hose	17.00
Rubber boots and shoes	33.00
Black mechanical scrap above 115 sp. gr.	20.00
General household and industrial scrap	15.00

† All consuming centers except Los Angeles.
‡ Akron only.
* All consuming centers.

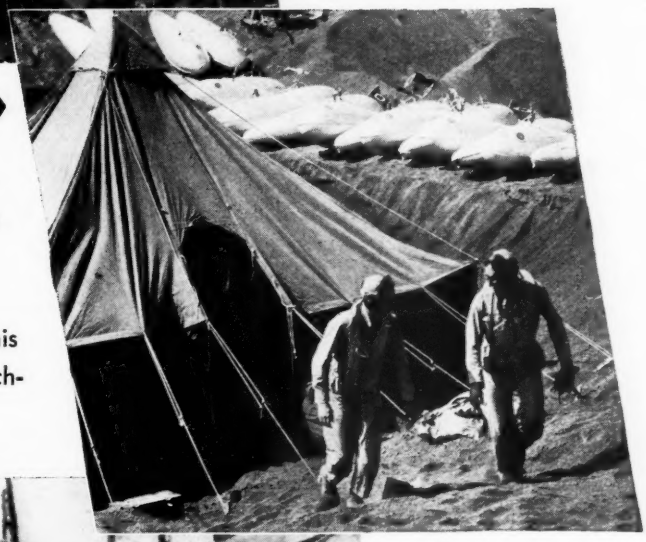
Fixed Government Prices*

	Price per Pound	
	Civilian Use	Other Than Civilian Use
Guayule		
Guayule (*carload lots*)	$0.17½	$0.31
Latex		
Normal (*tank car lots*)	.26	.43½
Creamed (*tank car lots*)	.26¾	.44¼
Centrifuged (*tank car lots*)	.27¾	.45¼
Heat-Concentrated (*carload drums*)	.29½	.47
Plantation Grades		
No. 1X Ribbed Smoked Sheets	.22½	.40
1X Thin Pale Latex Crepe	.22½	.40
2 Thick Pale Latex Crepe	.22	.39½
1X Brown Crepe	.21⅜	.38⅞
2X Brown Crepe	.21⅛	.38⅝
2 Remilled Blankets (Amber)	.21¼	.38¾
3 Remilled Blankets (Amber)	.21⅛	.38⅝
Rolled Brown	.18	.35½
Synthetic Rubber		
GR-M (Neoprene GN)	.27½	.45
GR-S (Buna S)	.18½	.36
GR-I (Butyl)	.15½	.33
Wild Rubber		
Upriver Coarse (crude)	.12⅝	.26⅛
(washed and dried)	.20¼	.37¾
Islands Fine (crude)	.14⅝	.28¼
(washed and dried)	.22½	.40
Caucho Ball (crude)	.11⅝	.24¾
(washed and dried)	.19½	.37
Mangabiera (crude)	.08½	.19¾
(washed and dried)	.18	.35½

* For a complete list of all grades of all rubbers see Rubber Reserve Co. Circular 17, p. 169, May, 1943, issue.

MORE EMPHASIS ON THE PACIFIC MEANS MORE DEMAND FOR DUCK

Transport planes evacuate wounded from Iwo Jima. Airport personnel and supplies are sheltered under tents made of duck.



Fighter command pilots on Iwo Jima lived in duck tents set up in hollows scooped in the volcanic ash. Fighter plane belly tanks are shown in the background.

Duck tent and tarpaulin protects this army aid station set up in the beachhead at Okinawa.

AT HOME all production of our famous Superior Army, Oceanic, Cypress, Sherman, Monarch, Buckeye and Magnolia duck continues to be channeled to the armed services and to those essential industries able to comply with current government directives.

Wellington Sears Company, 65 Worth Street, New York 13, N. Y.

WELLINGTON SEARS COMPANY, NEW YORK

RECLAIMED RUBBER

TO date there has been no definite news on the findings of the classification committee of Rubber Reclaimers Assn., headed by Charles Brooks, of Goodyear, as to means and methods of identifying and sorting contaminated scrap. Tire parts continue to be in great demand, but, for the most part, it is the peels which are available and not the fabrics. No whole tires are available in quantity at present. The reclaiming industry is still somewhat short of its monthly production goal of 25,000 tons, with manpower still continuing a major problem.

Reclaimed Rubber Prices

	Sp. Grav.	¢ per Lb.
Auto Tire		
Black Select	1.16-1.18	7 / 7¼
Acid	1.18-1.22	8 / 8¼
Shoe		
Standard	1.56-1.60	7½/ 7¾
Tubes		
Black	1.19-1.28	11¾/12
Gray	1.15-1.26	12½/13½
Red	1.15-1.32	12½/13
Miscellaneous		
Mechanical blends	1.25-1.50	5 / 6

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

Rims Approved and Branded by The Tire & Rim Association, Inc.

Rim Size	Apr. 1945
15" & 16" D. C. Passenger	
16x4.00E	31,390
16x4.25E	13,035
16x4.50E	57,787
15x5.00F	6,157
16x5.00F	15,965
15x5.50F	7,966
16x5.50F	3,590
16x4.25E-Hump	1,413
15x6½-I	1,260
16x6½-I	448
Flat Base Truck	
20x3.75P	2,178
17x4.33R	265
18x4.33R	948
20x4.33R	43,198
15x5.00S	10,046
18x5.00S	3,686
20x5.00S	362,795
20x6.00T	56,250
22x6.00T	860
15x7.33V	224
20x7.33V	36,176
22x7.33V	5,660
24x7.33V	2,422
24x8.37V	1,453
Semi D.C. Truck	
16x4.50E	5,059
15x5.50F	1,889
16x5.50F	3,570
Tractor & Implement	
12x3.00D	739
15x3.00D	15,823
16x3.00D	829
20x4.50E	2,029
22x4.50E	443
36x5.50F	158
24x5.50R	776
24x6.00S	2,935
36x6.00S	409
20x8.00T	1,632
24x8.00T	6,330
28x8.00T	1,720
32x8.00T	1,973
36x8.00T	407
40x8.00T	650
W7-24	387
W8-24	8,401
W8-36	517
W10-28	3,555
W10-38	1,824
DW8-38	646
DW9-38	14,241
DW10-38	4,530
DW11-38	3,328
Cast	
24x15.00	45
TOTAL	750,017

SINCE 1880 RUBBER GOODS

Rand. REG. U. S. PAT. OFF.

"They Last Longer" REG. U. S. PAT. OFF.

DRESS SHIELDS
DRESS SHIELD LININGS
BABY PANTS
BABY BIBS & APRONS
SANITARY WEAR
RUBBERIZED SHEETING
RUBBER APRONS
STOCKINET SHEETS
RUBBER SHEETS
RAINCAPES & COATS
RUBBER SPECIALTIES
DOLL PANTS, CAPES, ETC.
RUBBER DAM & BANDAGES — SHEET GUM

RAND RUBBER CO. BROOKLYN, N. Y. U. S. A. MFRS.

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Our chemical, bacteriological, engineering and medical staff with completely equipped laboratories are prepared to render you Every Form of Chemical Service.

Ask for "The Consulting Chemist and Your Business"

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GRANULATED CORK

FOR EXTENDING RUBBER

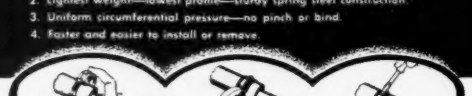
SOUTHLAND CORK COMPANY

P. O. BOX 868 NORFOLK, VA.

Man-What a Hose Clamp!

New Speed Clamp Features*

1. Exclusive, self-locking ratchet type design.
2. Lightest weight—lowest profile—sturdy spring steel construction.
3. Uniform circumferential pressure—no pinch or bind.
4. Faster and easier to install or remove.



Widely used throughout military aircraft. May be used over and over again. Sizes from ½" O.D. up. In writing for samples, please give outside diameter of hose with fitting inserted.

TINNERMAN PRODUCTS INC.
2132 FULTON ROAD • CLEVELAND 13, OHIO
In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
In England: Simmonds Aerocessories, Ltd., London

*Trade Mark Speed Nuts FASTEST THING IN FASTENINGS

Speed Clamps for hose connections are engineered and produced by the manufacturers of the famous SPEED NUT shown above.

MOLDEZE

The Mold Treatment for Plastics and Rubber

"In all our years in the rubber business we never have seen the equal to MOLDEZE" . . . says Chf. Engr. famous rubber firm.

Majority of Leading Firms now use MOLDEZE

Send for 1 long-lasting pint . . . $5 delivered

PROTECTIVE COATINGS, INC., BOX 56RA, DETROIT 27

FOR EASY PROCESSING, USE PHILBLACK A

(FOR FURTHER DETAILS, SEE AD ON PAGE 256)

IN WAR—few products of modern industry have played a more versatile, significant role than Reclaimed Rubber . . . few have met so many tests so successfully. Time and again Reclaim has proved indispensable—stepped into the breach to alleviate dangerous shortages of Crude and Synthetic Rubber and Carbon Black. For these accomplishments credit the unceasing practical research conducted by America's great rubber reclaiming industry, of which U. S. Rubber Reclaiming is among the oldest and largest.

IN PEACE—look to better-than-ever Reclaim for expanded usage in a vastly wider range of improved rubber products. Look to the ability of Reclaim to effect greater speed and economy in compounding and processing . . . for research in Reclaim, Natural and Synthetic, as marked by Buffalo's own contributions, is certain to produce these practical results. Present and potential users of Reclaim are invited to avail themselves of Buffalo's research organization in adapting Reclaim to their specific requirements.

U. S. RUBBER RECLAIMING CO., INC. **PLANTS AT BUFFALO, N. Y.**

500 Fifth Avenue, New York 18, N. Y.

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Dugan & Campbell
907 Akron Savings & Loan Bldg.

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689 Pennington Ave.

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Allow nine words for keyed address.

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with experience in general proofing.

Suburban Boston Area. Permanent postwar position. Must be able to furnish Certificate of Availability.

ADDRESS BOX NO. 910, Care of INDIA RUBBER WORLD.

RUBBER CHEMIST AND FACTORY MANAGER TO operate a small rubber plant in Philadelphia area, manufacturing engineered rubber and synthetic rubber specialties. State qualifications. Address Box No. 157, care of INDIA RUBBER WORLD.

RUBBER COMPOUNDER WITH EXPERIENCE for mechanical rubber goods manufacturer located in Midwest. First letter should give full details as to experience, qualifications, salary desired, etc. Address Box No. 158, care of INDIA RUBBER WORLD.

CHEMICAL ENGINEER. EXCELLENT OPPORTUNITY is open for a graduate with thorough basic scientific training and 8 to 15 years' experience in industrial process plant operation, maintenance, installation, and layout, preferably in rubber reclaiming or related industry, and including some years in supervisory or directive capacity. Location New Jersey. Well-established company. Give full information in first letter. Address Box No. 147, care of INDIA RUBBER WORLD.

ENGINEER FOR DESIGN, INSTALLATION, MAINTENANCE, and process development work as assistant to Chief Engineer of a well-established rubber goods manufacturing company in Central New Jersey. An excellent opportunity for a technical graduate of 30 to 40, with experience in supervising and directing these lines of work on both production and auxiliary department equipment. Address Box No. 148, care of INDIA RUBBER WORLD.

GRADUATE CHEMIST AND CHEMICAL ENGINEER wanted by progressive eastern rubber manufacturer for compounding and production control divisions. Previous experience desirable, but not essential. List qualifications and salary desired in first reply. Address Box No. 149, care of INDIA RUBBER WORLD.

WANTED: COLOR MATCHER FOR COATED FABRICS. Technical training helpful, but not essential. Observe W.M.C. rules. PO 478, Passaic, New Jersey.

CHEMIST: THOROUGH KNOWLEDGE OF TIRE, TUBE, OR mechanical goods manufacture. Plant located in Pennsylvania. Excellent opportunity. All replies strictly confidential. Address Box No. 140, care of INDIA RUBBER WORLD.

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TIRE AND TUBE DEVELOPMENT AND SPECIFICATION ENgineers—progressive small eastern concern. Definite opportunity for advancement for man with experience and capability. Address Box No. 139, care of INDIA RUBBER WORLD.

FACTORY SUPERINTENDENT—FOR HEAVY MECHANICAL Rubber Mill, definite opportunity for advancement. State age, education, plant experience, including handling of labor, salary expected. Permanent position, old established company. Address Box No. 155, care of INDIA RUBBER WORLD.

TIRE AND TUBE PLANT LOCATED IN SOUTH HAS OPENING for Rubber Chemist. Requirements: experience in all phases of processing and manufacture tire and tube stocks. Good opportunity for energetic man looking for a postwar job with possibilities of advancement. Give full particulars including expected salary in first letter. Address Box No. 138, care of INDIA RUBBER WORLD.

SITUATIONS OPEN (Continued)

RUBBER CHEMIST: Research and development. Experience in rubber compounding including synthetics.

ADHESIVE CHEMIST: Research and development. Experience in the use and preparation of adhesives of the water dispersion type, and cut back type.

CHEMIST—AUTOMOTIVE PRODUCTS: Knowledge of sound dampening, adhesives, saturated felts desirable. Must be capable of supervising group of Automotive Products Chemists.

PHYSICAL CHEMIST: Research and development. Specialist in emulsions and colloids.

PLANT CHEMIST: Experience in control work.

Company has excellent postwar future, wonderful opportunities for right men. Location, Metropolitan New York Area. Send complete resumes including draft status. Address Box No. 156, care of INDIA RUBBER WORLD.

ONE OF OUR CLIENTS WISHES TO EMPLOY AN EXPERIenced salesman of mechanical rubber goods. Please give full résumé of experience and state age; background of production experience desirable. Excellent opportunity. Compensation open. Replies held confidential. Address Box No. 141, care of INDIA RUBBER WORLD.

TIRE CURING FOREMAN: OPENING FOR EXPERIENCED FOREman capable of supervising production. Attractive postwar as well as present-day opportunity. Eastern concern. Address Box No. 142, care of INDIA RUBBER WORLD.

CHEMIST: EXCELLENT POSITION FOR MAN WITH INDUStrial experience in plasticizers and general rubber compounding. Large eastern oil company. State training, salary desired, and submit photograph. Address Box No. 143, care of INDIA RUBBER WORLD.

TIRE FINISHING SUPERVISOR: MUST HAVE THOROUGH knowledge of all phases of inner tube manufacture. Opening offers excellent opportunity for advancement with postwar security. Located in Pennsylvania. Address Box No. 144, care of INDIA RUBBER WORLD.

FOREMAN FOR RECLAIM RUBBER OPERATION. PLANT NOW engaged in essential war work. Unexcelled postwar opportunity. Located in Metropolitan New York area. Send full particulars including salary requirement and draft status. Address Box No. 145, care of INDIA RUBBER WORLD.

TUBE ROOM SUPERINTENDENT AND FOREMAN: MUST HAVE thorough knowledge of all phases of inner tube manufacture. Opening offers excellent opportunity to man with initiative and ability. Plant located in Pennsylvania. State qualifications in first letter. Address Box No. 146, care of INDIA RUBBER WORLD.

CHIEF CHEMIST OR CHEMICAL ENGINEER: EXPERIENCED IN compounding natural rubber and synthetic rubber (neoprene and GR-S). Production quality control, development and research work. Excellent postwar opportunities. Plant located in Rhode Island. Address Box No. 161, care of INDIA RUBBER WORLD.

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Consulting Technologist — Synthetic Rubber
We are equipped to perform all types of physical and chemical tests for synthetic rubber.
Fairhaven — Massachusetts

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STOCK SHELLS — **HOSE POLES**
MANDRELS
NATIONAL SHERARDIZING & MACHINE CO.
868 WINDSOR ST. — HARTFORD, CONN.
Representatives
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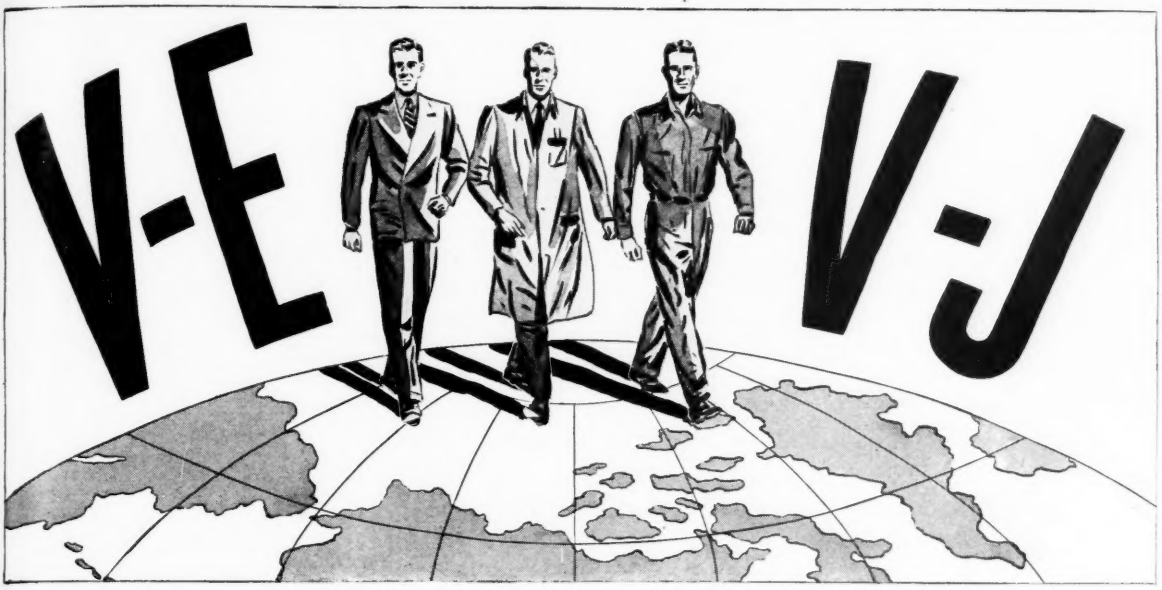
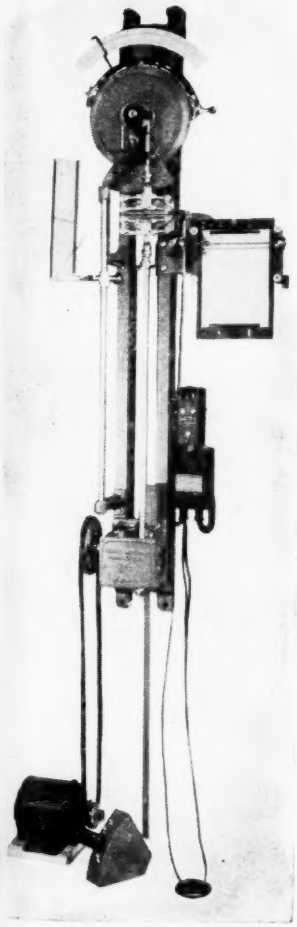
ENERPRENE
A Non-Rubber Cement for Bonding Synthetic Rubber to Metal, etc.
THE ENERPRENE COMPANY
1910 First Central Tower — Akron, Ohio

(Classified Advertisements Continued on Page 372)





New "XL" Rubber Tester for your post-war planning

Here is one of the most versatile and convenient rubber testers we have ever offered. Capacities from 0 to 75 lbs. Elongation up to 1200% of specimen. Starting distance between clamps controllable by operator. Instant return of pulling clamp to starting position. Speed of pulling clamp variable, up to 20 inches per minute. Request circulars to learn fully about the numerous advantageous features of the "XL" and our 60 other models for tensile, hysteresis, burst, flexing, twist, adhesion, plasticity, compression-cutting, state-of-cure, etc., etc.

Circulars upon request

SCOTT TESTERS
*Registered Trademark

SCOTT TESTERS, INC.

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PROVIDENCE, R. I.

Scott Testers — Standard of the World

—NEW— **MACHINERY** —USED—

RUBBER MILL INDUSTRY
OUR NEW MACHINES
MIXERS — MILLS — CUTTERS — SAFETY BRAKES
SUSAN GRINDERS — TRIMMERS — LIFT TABLES — HYDRAULIC PRESSES

OUR FIVE POINT REBUILDING PROCESS
1—INSPECTION *2—DISASSEMBLY*
3—REBUILDING
4—MODERNIZING *5—GUARANTEE*

L. ALBERT and SON

TRENTON, N. J. *AKRON, OHIO*
LOS ANGELES, CAL. *STOUGHTON, MASS.*

An International Standard of Measurement for

Hardness • Elasticity
Plasticity of Rubber, etc.

Is the DUROMETER and ELASTOMETER (23rd year)

These are all factors vital in the selection of raw material and the control of your processes to attain the required modern Standards of Quality in the Finished Product. Universally adopted.

It is economic extravagance to be without these instruments. Used free handed in any position or on Bench Stands, convenient, instant registrations, fool proof.

Ask for our Descriptive Bulletins and Price List R-4 and R-5.

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Van Wyck Ave. and Carll St., JAMAICA, NEW YORK
Agents in all foreign countries.

New Rubber Spreaders
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Saturators

Used – Rebuilt – Rubber – Chemical and Paint Machinery

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41 Locust Street **Medford, Mass.**

SPECIALIZING IN
USED MACHINERY FOR THE **RUBBER**
AND ALLIED INDUSTRIES
MILLS, CALENDERS, HYDRAULIC PRESSES,
TUBERS, VULCANIZERS, MIXERS, ETC.
ERIC BONWITT AKRON 8, OHIO

Classified Advertisements

Continued

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: NEVER USED Cleveland Speed Reducer, 139 H.P. ratio 8 to 1. Tubers 3¼" to 6". 3—30 x 24" Hydraulic Presses, 12" rams. 4—W. & P. Mixers, up to 625-gallon capacity; 10—High Pressure Hydraulic Pumps, Accumulators up to 6,000 GMP. Dry Mixers, Grinders, Pulverizers, etc. Send for complete list. Consolidated Products Company, Inc., 13-16 Park Row, New York 5, N. Y.

ONE 23 x 10 4-ROLL CALENDER COMPLETE WITH DRIVE, motor and electrical equipment. Excellent condition. Can be seen in operation. 2-18 x 54 calender rolls. 1-15 h.p. Gould sump pump. KEATON RUBBER CO., 429 Adams St., Newark, N. J. Market 2-3364.

MACHINERY AND SUPPLIES WANTED

WISH TO PURCHASE HYDRAULIC PRESSES, INJECTION Molding Machines, Mixers, Mills, Pumps, Vulcanizers, Calenders, Banbury Mixers. No dealers. Address Box No. 154, care of INDIA RUBBER WORLD.

NEW AND BETTER
GAMMETER'S
ALL STEEL ALL WELDED
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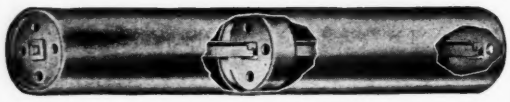

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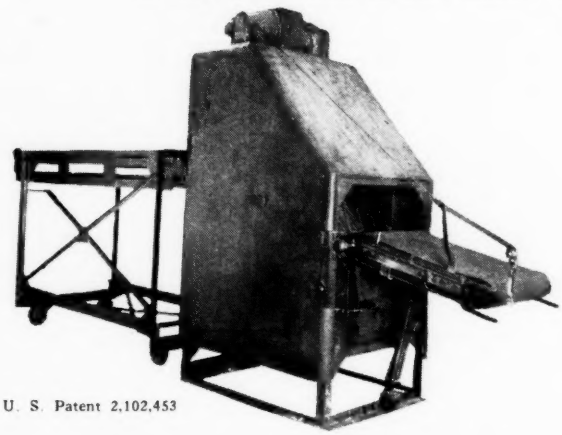

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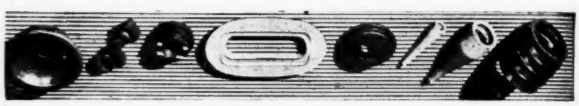

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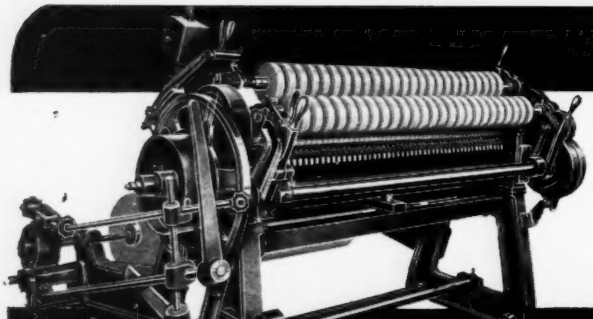

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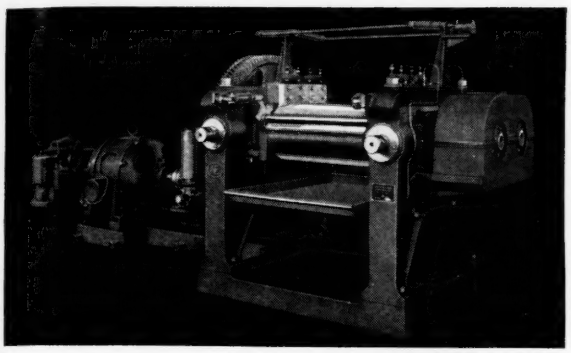

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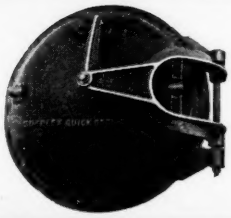

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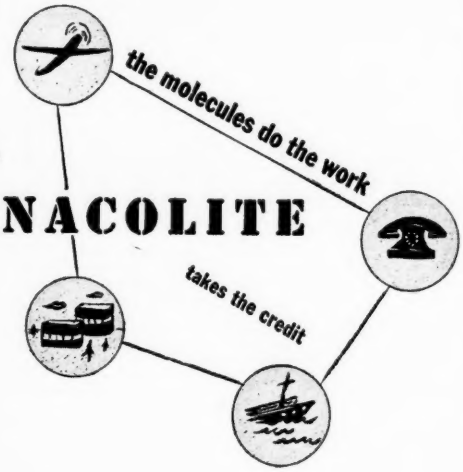

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The Contest closes August first. All inquiries should be addressed to Bruce W. Hubbard, Chairman, Chicago Rubber Group, 2512 West 24th Street, Chicago.

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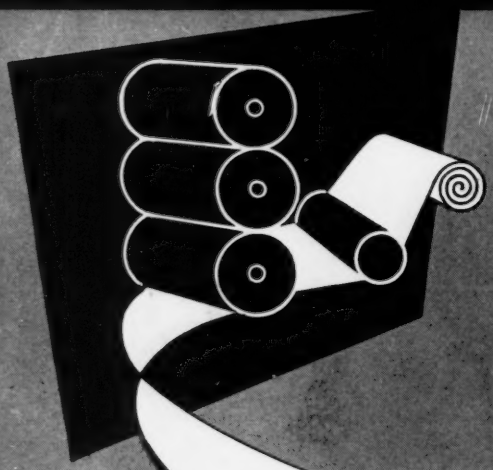
SCRAP RUBBER



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This paper may be obtained in any width up to and including 54", and is furnished in rolls of 9", 11½", 13", and 15" diameters; put up on 3" i.d. cores. The yield is approximately six square yards to the pound. A 9" roll contains about 375 linear yards and a 15" diameter about 1150 linear yards.

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